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## SOCIOMETRY, 1948

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## EDITORIAL

Public discussion of postwar problems has revealed an ambivalence of feeling which places the social scientist in a curious position. Probably the most clearcut delineation of his dilemma appeared in the Congressional consideration during the past year of legislation for the establishment of a National Science Foundation planned with the basic purpose of refilling the reservoir of scientific talent and of fundamental research depleted by the war. The value of such a foundation for social research is obviously great. The need of sophisticated techniques for handling the community aspects of developments in physical science is at last realized to be urgent. The need also of the coordination which a central agency could give is particularly compelling in the social sciences so addicted to small and geographically limited studies. It was therefore the more disappointing that the Foundation could not be planned to include any specific provision for social research and that this failure sprang not from the sponsoring scientists but from Congress whose frank distrust of current social investigation proved to be pronounced.

In the discussion of a possible social science division the opposition of Congress seemed to be chiefly based on two objections both of which are germane to the present issue of *SOCIOMETRY* which attempts to emphasize the quantification of interpersonal relations. First, there was a confusion of social science with nonscientific fields, even areas characterized by charlatantry. Second, there was a fear of liberal trends and the implementation frequently provided them by scientific investigations, for example, the experiments which have supported racial equality.

Unfortunately the second objection is not a reason for unqualified self-congratulation on the part of social scientists, since it indicates a deep-seated fear which they have been unable to allay. The anxieties of the legislators stem from the fact that custom is not an intellectual contrivance to be used conditionally until its logical inadequacies are exposed, but an emotional refuge whose habitual satisfactions are not given up without a wrenching of the personality and of community relationships.

Thus, while the scientist is publicly beseeched to experiment in any way necessary to prevent new wars, he is simultaneously presented with every evidence that society wishes to change for the better only by remaining the same. An ironic result of this condition is the fact that present techniques for group adjustment may be turned to the pursuit of war instead of peace, since they are developed enough to be useful in unifying a mobilizing nation but not enough to reduce appreciably international tensions.

It becomes obvious that if the social scientist is to perform extensive operations on society he must prove himself no charlatan but an accurate predictor of the beneficial results he claims. Yet in the face of this need he continues to exhibit a marked deficiency of interest in the development of mathematical treatment of the structure and functions of the social group. Although this type of study has attracted a number of able and productive mathematicians, it continues to show a serious shortage of mathematically interested personnel, a greater shortage than exists in other sciences.

A necessary long-range remedy of the situation is of course to develop more mathematically minded students in the field. But a more immediately beneficial aid would be, as Gregory Bateson has suggested in *Science*, to effect a closer tie-up between social investigation and allied but more highly developed disciplines. This would not be simply a turning over of experimental results to professional statisticians with questionable understanding of interpersonal concepts; instead, it would be an active collaboration with interested mathematicians to produce quantitative concepts and experiments designed so as to yield accurate and meaningful results. The present difficulty is in the prevalence of insufficiently rigorous thinking with a resultant substitution of speculation or descriptive "exploratory" investigations for precise and carefully designed hypothesis and experiment.

Undoubtedly the most suitable allied field for such collaboration is psychometrics some of whose workers are already becoming interested in the quantitative treatment of social data. Psychometric concepts can by no means be taken over bodily, but uniquely social concepts could be developed by psychometrists who have a genuine interest in such a theoretical framework. An example of cooperation between social scientist and psychometrist, an application of machine methods to sociometric data, is presented in this issue of SOCIOMETRY. Another article originating in the field of psychometrics has been promised for a later issue.

It is therefore suggested that SOCIOMETRY make it a part of its mission to actively encourage the publication of theoretical or experimental research in which social scientists and mathematicians in allied fields carry out co-operative projects. Such articles would be a valuable supplement to the journal's other content on basic theory, experiment, and statistics, developed by sociometrists themselves. The "borrowing" of psychometric knowhow, added to his own efforts, can materially aid the social scientist in achieving the statute which his newly defined community responsibilities require of him.

JOAN H. CRISWELL  
*Issue Editor*

## APPLICATION OF MACHINE TABULATION METHODS TO SOCIOMETRIC DATA

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The use of the sociometric test on large numbers of individuals may result in considerable clerical labor in the analysis of the data, especially if unlimited choice is employed under more than one criterion. The labor of the experiment, moreover, is frequently increased by fractionation of the data according to various categories such as race, sex, age, religion, etc., and determination of interrelationships between subgroups differentiated on these bases. Most helpful in this work can be the International Business Machines accounting installations which are becoming increasingly numerous in colleges and government agencies as well as in industry.

Not all problems of course are extensive enough to make machine methods economical. Some populations of small groups choosing under one criterion, each group analyzed separately, might possibly be better treated by hand tabulation. Before undertaking the analysis the experimenter must estimate the amount of time required for machine versus hand methods. For investigations judged sufficiently extensive the methods to be described save time not only through speed of sorting and tabulation but through reduction of time lost in checking clerical work and correcting errors.

Many typical sociometric analyses can be rapidly made after familiarity with machine methods is acquired. In the present article a basic knowledge of IBM punched card equipment is assumed. Manuals on elementary IBM operations can be obtained from the International Business Machines Corporation and are usually available at machine installations. To show what can be done by adaptation of data to machine tabulation an illustrative experiment will be described.

*The experiment.* The population consists of school children of both sexes distributed in classes of about 35 members each in grades three through eight. Both colored and white children are present in all classes. Whites are mainly of Italian or American parentage. All subjects are rated on a ten-point scale of socio-economic status.

In the test children choose other members of their own class under the following three criteria:

1. Which of your classmates would you like to sit by to study with?
2. Which of your classmates would you like to eat lunch with?

3. Which of your classmates would you like to play games with on the playground?

Under each criterion subjects are permitted to make as many choices as they please, giving their choices in order of preference.

The data are analyzed sometimes according to each criterion separately, sometimes according to all criteria pooled. Frequency distributions are made up both for choice considered without regard to reciprocation and for reciprocated choices, reciprocation being defined as A choosing B and B choosing A.

A. Sample questions to be answered for a class are:

1. How many choices did each person make?
2. How many times was each person chosen?
3. How many choices of each person were reciprocated?
4. How many intrasexual and intersexual choices were made?
5. How many choices did white girls give to white girls, colored girls?
6. How many interracial and how many intraracial choices were reciprocated?
7. How many interracial and intraracial choices were made by groups of different socio-economic status?

Basic to any type of analysis would be frequency distributions of the types listed above. Many other breakdowns of the data could be made. All necessary frequency distributions can be obtained by use of the sorter and tabulator, once the punched cards have been prepared on the key punch and reproducer.

*The analysis by machine.* Since one choice by one individual is the basic unit in studies of this type, a flexible method is to punch a card for each choice of each individual. This produces elements which can be combined in any way desired. Each card should contain the following information numerically coded: (1) group, e.g., class 6B2, (2) chooser, (3) background factors of chooser, i.e., sex, nationality, religion, etc., (4) criterion of choice, (5) degree of preference, (6) individual chosen, (7) background factors of individual chosen.

The arrangement of the data on the card can be of any type provided that the same information is punched in the same field on all cards. The punching can be facilitated by laying out the test form with spaces in which the codes can be entered before punching. If the names of those chosen are recorded by the chooser on successive lines, a card can be punched for each line.

Figure 1 illustrates the method. All numbers to the right of the vertical line are inserted by the coder. For individual names the first three digits



are an identification number which may if desired include the identification number of the group; the last five are coded background factors, e.g., female sex: 2, American white: 3, protestant religion: 1.

FIGURE 1

Class 6B2	18
Name <i>Mary Smith</i>	428 231 16
Which of your classmates would you like to sit by to study with?	1
1. <i>Mary Johnson</i>	403 26 322
2. <i>Molly Cotton</i>	429 23 361
3. <i>John Jones</i>	413 13 156
4. <i>George Doe</i>	412 11 113
5.	
6.	

Punching directions for the form illustrated would be as follows:

1. Punch into card columns 1 to 11 the numbers on the right side of the form beginning at the top and continuing down to the double line, e.g., 18 428 231161.

2. Place this master card in the duplicating rack of the key punch so that the first 11 columns of the succeeding cards will be punched automatically.

3. After the first 11 columns have been punched look at line one below the double line and, beginning with column 12, punch the choice number and eight numbers appearing thereafter, ending in column 20.

4. Eject the card, allow the first 11 columns of the next card to duplicate, and punch the choice number and numbers on the right for line two below the double line.

5. Continue this procedure until a card has been punched for each line.

6. Discard the master card and punch the new master card for the next form.

The punching directions assume that choices under the three criteria are listed on three separate forms.

After the cards have been punched and verified the various distributions are obtained on the sorter and tabulator. If the cards are sorted according to chooser and criterion and run off on the tabulator, a record can be printed of the choices made by each individual, his total number made un-

der each criterion, total for all criteria, etc. The cards can then be sorted according to person chosen and a similar record printed for choices received. Intergroup and intragroup totals of choice, e.g., colored-colored, colored-white, etc. are readily obtained by successive sorts. Shortcut methods of obtaining sorts and basic tabulations can be developed to suit the conditions of the particular experiment.

The problem of determining the number of reciprocations between individuals or groups is a little more complicated but yields the greatest gains in speed and accuracy. A convenient method is as follows:

1. Reproduce the whole deck on the reproducer, exchanging the fields containing the identification number and background data of the chooser and the fields containing the corresponding information for the chosen person. If the information for the chooser, 42823116, occupied columns 3 through 10 and the "chosen" fields, 40326322, occupied columns 13 through 20, after the exchange, code numbers 42823116 would be in columns 13 through 20 and 40326322 could occupy columns 3 through 10.

2. Place the two decks, A and B, together and sort on the two fields containing the identification numbers of chooser and chosen, sorting first on the "chosen" identification number. Sort on criterion, then on group identification number so that the deck is arranged in successive class groups within each criterion.

For each class group and criterion separately, tabulate the cards, minor controlling on chooser's identification number, major controlling on criterion and group number, and adding a card count for each minor control group. The cards will be listed according to class group and identification number of chooser as recorded in the original deck. A reciprocated choice will be indicated by a card count of 2; an unreciprocated choice by a card count of 1. The number of reciprocal pairs is half the number of 2-counts and the number of unreciprocated choices is half the number of 1-counts but can be most easily obtained by subtracting the number of 2-counts from the total choices under that criterion. Totals can of course be obtained for each individual as well as for the group as a whole, and individual members of mutual pairs can be identified.

5. If a tabulator is not available, use a different card color for the reproduced deck. As before, sort the two decks together, then sort on criterion, finally on group identification number. For each criterion group separately, remove all pairs of adjacent cards of different colors and sight check to pick out the pairs in which the two cards are punched the same in the fields that were exchanged. Each such pair represents a reciprocated



choice. Unreciprocated choices are equal to half the number of single unmatched cards.

6. If the reproduced deck has been gang punched with an "X" or some other identifying punch in one of the unused columns, it will be easy to separate the two decks on the sorter. Such punching will also enable the experimenter, if he wishes, to designate reversed field cards by an asterisk on the printed record.

It may be of interest to know the reciprocations between different categories, for example, how many white boys were reciprocated by the white boys they chose, how many were chosen by the colored boys they selected, etc. In such cases the sort is made in such a way as to list together the members of the relevant categories. It is then possible to total by hand from the tabulation sheet the number of 2-counts in each category, or count the number of bi-colored matching pairs in the designated grouping of the deck of sorted cards. In order to obtain reciprocations for groups broken down for sex and race the procedure would be to sort in the following order: identification number of chosen, race of chosen, sex of chosen, chooser's identification number, chooser's race, chooser's sex, criterion, class group. The tabulation of choice would then be in the order of: white boys choosing white boys, white boys choosing white girls, white boys choosing colored boys, white boys choosing colored girls, white girls choosing white boys, etc.

The procedures have been stated for cases in which only reciprocation occurring within a single criterion is considered. But the technique also applies to reciprocations passing between criteria, for example, Mary Smith choosing Mary Johnson under criterion 1 and being chosen by Mary Johnson under criterion 2. For such cross-criterial reciprocations: after Deck B is reproduced from Deck A, sort each deck separately into criterion groups; sort together the criterion 1 group of Deck A and the criterion 2 group of Deck B; tabulate or sight check as before; the resulting total of reciprocated choices represents the number occurring between individuals choosing under criterion 1 and being reciprocated under criterion 2. The same process is then followed, sorting criterion 2 group of Deck A against criterion 1 group of Deck B. The totals for these sorts plus the totals for the sorts under criterion 1 alone and under criterion 2 alone give the grand total of reciprocated choices, if only two criteria have been used. When more than two criteria were used, as in the present experiment, further sorts would be included for criterion 1 against 3, 3 against 1, 2 against 3, 3 against 2, until all possible permutations of the criteria taken two at a time had been used.

The total reciprocated choices are again subtracted from the total choices to give the number of nonreciprocals. One of the authors has shown (1) that the total number of choices in this case is  $Nc^2d$  where  $N$  is the number in the group,  $c$  is the number of criteria, and  $d$  is the number of choices made per person.

It will be found in carrying out procedures such as those discussed, that the machines available can be individually adapted to a wide variety of uses or employed together to supplement each other in numerous ways. Since new ways of using them are constantly being developed, the suggestions we have provided are intended only as a starting point for improved labor saving methods of this type.

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## ON THE MATRIC ANALYSIS OF SOCIOMETRIC DATA

LEO KATZ

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In a previous article (1) an attempt was made to obtain a matrix formulation of the results of sociometric tests. That article gave rise to considerable discussion, including a defense of the sociogram by Moreno (2). It was certainly not the contention of the authors that the sociogram device had failed in any way, but rather that it had apparently reached the limits of its usefulness in the interpretation of sociometric data. It is certainly implicit in the work of Northway (3) in attempting to introduce order in the sociogram by the "target-area" device and in the work of Cook (4) in stratifying the sociogram that a more quantitative approach to the problem is necessary. The sociometric art has simply progressed to the point where pictorial representation of relationships is not enough; we must seek some way of quantifying the data. This, it was hoped, the matrix might do.

Let us first examine the background of the matrix formulation. The individual datum of the test is the response or reaction of person *a* to person *b*. These reactions may be expressed in various ways on different scales, but in any scale there is the possibility of no response at all (usually termed "indifference"). A response of this sort is a valid datum; indeed, it will later be shown that indifference may be, in a certain sense, just as significant as some other response. To be quite safe, then, our analysis should carry these zeroes. From a test administered to *N* individuals in a group, we obtain each one's reaction to the other (*N*—1), or a total of *N*(*N*—1) data. These are most compactly exhibited in a square matrix where the main diagonal elements are the identifications of the individuals. Thus, if George chooses Henry, Henry chooses George and rejects John, while John chooses George, these data may be represented in the following square array:

G	1	0
1	H	—1
1	0	J

In this representation, the diagonal elements serve only to identify rows and columns, while entries in rows represent "outgoing" choices and, in columns, "incoming" choices. In this way, although the matrix was constructed on the basis of outgoing choices, it may be interpreted in terms of incoming choices, viz., George is *chosen* by both Henry and John, Henry is chosen by

George and ignored by John and John is ignored by George and rejected by Henry.

Writing the data of the sociometric test in this compact, natural form gives us a matrix whose main diagonal elements are identification elements and whose elements off the main diagonal are the responses given in the test. It is also possible to interpret the matrix as a collection of vectors and each row (or column) as a vector of reactions of one individual to (or from) the others. All of the formal processes of the algebras of matrices and of vectors are available for analysis of the data; it is hoped that certain of these processes may have meaning in a sociological sense. A few of these processes will be discussed in this paper, together with a more complete formulation of the matrix representation of sociometric data.

#### THE MATRIX REPRESENTATION

*Elements.* The elements (other than main diagonal elements) are reactions of one individual to another. The numerical values taken on by elements vary according to conditions of the test and the scale used. For instance, in the simple example above, the test called for response on a basis of choice, indifference or rejection, to be represented numerically by +1, 0 or -1, respectively. Some tests are given on a 5-point or 7-point basis, some on a complete ranking from 1 to  $(N-1)$ , and some on a one-sided scale, as in calling for choice only and not rejection. It is even conceivable that a test might call for response on a continuous scale. In any event, there is a set of numbers corresponding to values taken on by the individual responses and making up the field over which the matrix is defined. There is also the possibility of differences in the number of choices allowed by the test. Some tests restrict the number of choices to three or five, perhaps; others (these are in the majority) have no restriction whatever on the number. This is handled in stride by the matrix, which simply has more or fewer zeros in each row.

*Vectors.* Vectors are formed from the elements by introducing any order at all among the individuals of the group. It is important to note that since this ordering is entirely arbitrary, it can be changed at will in the subsequent manipulation. Each row vector is formed by putting in the first position an individual's response to the first individual, in the second position his response to the second, etc. In the position corresponding to an individual's reaction to himself, we place initials or some other symbol identifying the individual. No response (i. e., indifference) is indicated by a zero or

a blank space, as is most convenient. The vectors defined in this way are  $N$ -dimensional row vectors, whose  $i^{\text{th}}$  elements represent reactions to the  $i^{\text{th}}$  individual in the group. Each vector summarizes one individual's reactions to all the others.

*Matrices.* If the  $N$  row vectors formed as above are arranged in a column according to the position element in each, i. e., in the same order as the individuals in the group or the elements in each vector, the result is a matrix with position elements in the main diagonal and the responses of the sociometric test as elements elsewhere. This matrix contains all the information collected in the test. As yet, there has been no processing and no attempt to interpret the data. With this correspondence between the elements in the matrix and the data of the test, we shall show that certain formal manipulations of the matrix have meaningful analogs in the interpretation of the sociometric test.

#### MATRIC OPERATIONS

*Canonical Forms.* It will be recalled that the ordering of rows and columns in the matrix was entirely arbitrary. Therefore, any simultaneous reordering of rows and columns will not change the meaning though it may change the position of an element. If it is possible to define a preferred ordering, we have the equivalent of a canonical form of matrix algebra. This definition was the primary object of an earlier paper (1). The main principle involved in obtaining any preferred ordering is maximization of concentration of positive choices about the main diagonal. One way of accomplishing this is through definition of a metric corresponding to perpendicular displacement from the main diagonal. If the interval from one row (or column) to the adjacent one is taken as unit, the square of the distance of the element in the  $i^{\text{th}}$  row and the  $j^{\text{th}}$  column from the main diagonal is equal to  $\frac{1}{2}(i-j)^2$ . We may then adopt the least squares notion and our problem reduces to that of minimizing  $\sum \sum e_{ij}(i-j)^2$ , where  $e_{ij}$  is the element in the  $i^{\text{th}}$  row and  $j^{\text{th}}$  column and the constant factor is dropped. The only operation at our disposal in performing this minimization is the simultaneous interchange of a pair of rows and the same pair of columns, corresponding to a permutation in the ordering. When the further interchange of any pair in the order will not reduce the sum of squares, we will call the result the canonical form of the matrix.

Mathematically, this sequence of operations is equivalent to multiplying the original matrix on left and right by a permutation matrix and its transpose (5, p. 227). Since the permutation matrix is unimodular, the original and



final matrices are necessarily equivalent. There are just two circumstances under which the matrix is not completely determined by the minimization process. The first of these is inevitable but is trivial; the second would occur only very rarely. In the first case, since our order relation has no preferred direction (strictly speaking, the relation is one of "betweenness" rather than order), the matrix may be exactly reversed. This situation is easily handled by identification of the matrix with its image in reverse order. The second case is somewhat more bothersome. It may be that, after minimization is complete, two blocks of rows (and columns) may be interchanged without affecting the sum of squares of distances. In this case, either form is valid. From the standpoint of interpretation, it makes no difference at all which form is used.

We now come to the reason for this maltreatment of the matrix. When minimization is complete, the resulting form has clusters of positive choices along the main diagonal and negative choices have gravitated to the extreme upper right and lower left hand corners. Each cluster of positive choices corresponds to a few individuals (their identifications appear in the main diagonal of the cluster) whose choices are concentrated within the cluster. Such individuals form a clique in the sociological sense. Thus cliques in the group correspond to the clusters obtained in the formal manipulation. Association between two cliques shows up in that their clusters appear in adjacent positions with a scattering of positive choices in the minors of the matrix appearing at the intersections of the block of rows of each with the block of columns of the other. If a scattering of choices appears in one of these minors but not in the other, this may be taken as evidence of some sort of social ordering of the cliques. A suggested interpretation of negative choices or rejections is as follows: Through the minimization process, negative choices are pushed to the extreme corners and the individuals giving and receiving these choices to the extreme positions along the main diagonal. This has two effects. In the first place, those individuals having highest social adjustment, in the sense used by Zeleny (6), will tend to positions in the center of the matrix; those having lower social adjustment, to the extremes. Secondly, cliques having greater amounts of inter-clique conflict will have clusters lying further apart along the main diagonal. Thus, distance between clusters in the matrix roughly corresponds to social distance between cliques. Factional disturbances will be evidenced by clusters far apart with the corresponding inter-clique minors heavily loaded with rejections.

We have thus far avoided discussion of the mechanical difficulties of the minimization process. Of course, any interchange of two rows and the

corresponding columns which reduces the sum of squares of distances is a step in the right direction. We know that only a finite number of such steps are necessary. However, this number might be very large. For this reason, in the earlier paper (1) on the same subject, a simple set of rules was given for the approximate minimization. These rules represent an efficient means of getting close to the final result. It is hoped that even more efficient methods may evolve through further study.

Once the canonical form of the matrix is established, methods developed by Zeleny (6) may be used to measure intensity of the relationships within and between cliques. In this connection, it should be noted that Zeleny's indexes of average intensity of choices expressed and of choices received are simply column and row vectors which may be considered to border (7) the original matrix and are derived from the elements of that matrix in the form of simple arithmetic means of rows and columns, respectively.

*Matric Equations.* With the traditional sociogram analysis, it is almost impossible to compare the structures of a group at two different times. Cook (4) has attempted to do just this, but his analysis of the structure of a 10th grade class at various times is not replete with statements concerning changes in structure. In the matric analysis, we have one matrix  $M_1$  in canonical form at one period and a second,  $M_2$ , at the other period. The obvious mathematical linkage between the two matrices is by means of a matrix equation relating them. We may write the equation symbolically as

$$M_1 = PM_2P' + C,$$

where  $P$  is a permutation matrix,  $P'$  the transpose of  $P$  and  $C$  an  $N \times N$  matrix with zeros on the main diagonal and constants (or zeros) elsewhere.

Mathematically relating the matrices  $M_1$  and  $M_2$  has produced two new quantities,  $P$  and  $C$ , for which we now seek sociological meaning.  $P$  is a permutation matrix, which has exactly one 1 in each row and column and zeros elsewhere. Multiplying  $M_2$  by  $P$  on the left has the effect of interchanging certain rows; by  $P'$  on the right, certain columns. Thus  $P$  and  $P'$  summarize the rearrangement of identification elements between the two periods of time. In other words,  $P$  is a formal  $N \times N$  matrix containing all the changes in group structure. If the structure does not change,  $P$  is the identity matrix with 1's in the main diagonal. Therefore, severity of change in group structure may be measured in terms of something like average distances of elements in  $P$  from the main diagonal.  $C$ , on the other hand, represents the difference between  $M_1$  and  $M_2$  when their identification elements are arranged in the same order. In this way,  $C$  contains all the changes

in individual reactions. If, now,  $C$  is bordered with its row and column means, we have the differential intensities, or changes in intensities of choices expressed and received. Combining the two means for each individual, we have his change in social adjustment.

Summarizing, the formal writing of an equation between  $M_1$  and  $M_2$  produces two new matrices, the first of which represents changes in the group structure, the second, changes in individual responses. We may illustrate by an example taken from Cook's paper (4). In that paper, sociograms are given for the same group in October, 1942 and in April, 1943. For simplicity, we restrict attention to the clique consisting of G, 14, M, 16 and J. It is easy to establish the canonical forms,

$$M_1 = \begin{vmatrix} 14 & + & . & . & + \\ + & G & + & + & . \\ . & + & 16 & + & . \\ . & + & . & J & + \\ . & . & + & + & M \end{vmatrix}$$

and

$$M_2 = \begin{vmatrix} 14 & + & + & . & + \\ + & 16 & + & + & . \\ + & + & G & + & + \\ . & + & + & J & + \\ + & . & + & + & M \end{vmatrix}$$

The permutation matrix is

$$P = \begin{vmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{vmatrix}$$

and has the effect of interchanging the second and third rows, while  $P'$  interchanges the corresponding columns. The change in group structure is very slight, with only two non-zero elements off the main diagonal and only a very little distance removed. The change consists only of G gravitating within the clique to its center, reflecting his solidification of the leader position. The matrix of changes in individual responses is

$$C = \begin{vmatrix} 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 \\ 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 1 & 1 & -1 & 0 & 0 \end{vmatrix}$$



The positional arrangement here is the same as in  $M_1$  (as also is the arrangement in the product,  $PM_2P'$ ). Summarizing the C matrix vertically, we may say that 14 has gained .5 unit in intensity of choices received and G, 16 and M .25 unit each. Horizontally, we say that each member has increased intensity of choices expressed by .25 unit, or the entire clique has increased its emotional expansiveness by that much.

*Product of Vectors.* It may be argued that the scales used in connection with sociometric studies are biased and that, for example, a positive choice expressed by an individual with high emotional expansiveness is less significant (in magnitude) than a negative response from the same person. In particular, suppose that one individual has complete emotional expansiveness, so that he chooses everyone in the group. Then, certainly, the fact that he chose John is not very significant. This kind of "watering-down" of the significance of any response can occur in four ways, viz., if the person making the response chooses everybody or rejects everybody or if the person receiving the response is accepted by or rejected by all the others. It would seem, then, that corresponding to each response, there is an "expected value" of that response, conditioned by the emotional expansiveness of the responder and the social status of the respondee. This last statement contains the clue to a suggested approach.

Since the expected values of each response depend only upon the two factors and since we have at our disposal two vectors which contain all the indices of emotional expansiveness and social status, we may define a product of the two vectors to produce a matrix of the necessary values. If we "multiply" the column vector of average intensities of choices expressed by the row vector of average intensities of choices received, the result is an  $N \times N$  matrix with expected responses off the main diagonal and something very close to the ordinary index of social adjustment on the main diagonal. It remains only to define the "multiplication" involved. This definition is by no means obvious.

In order to force the values  $+1$ ,  $0$  and  $-1$  to behave decently, it was found necessary to separate the intensities into intensities of positive choices and of negative choices expressed and received. Then, the expected value of the response of individual  $i$  to individual  $j$  may be written

$$a_{ij} = \frac{P - Q}{1 - PQ}, \text{ where } P = 1 - (1 - e_i)(1 - r_j) \text{ and} \\ Q = 1 - (1 - e_i)(1 - r_j) \text{ and}$$

- $E_i$  is intensity of + choices expressed by  $i$   
 $R_j$  is intensity of + choices received by  $j$   
 $e_i$  is intensity of - choices expressed by  $i$   
 $r_j$  is intensity of - choices received by  $j$ .

In case only positive choices are used in the test, the situation is much simplified. It also appears that, in most situations, the approximation

$$a_{ij} = \bar{E}_i + \bar{R}_j \text{ (approximately),}$$

where  $\bar{E}_i = E_i - e_i$  and  $\bar{R}_j = R_j - r_j$ . If we write  $A = (a_{ij})$ , the matrix of elements  $a_{ij}$ , then is the matrix of expected values of the elements of  $M$ , and these two matrices may be compared for significant deviations.

*Angle between Vectors.* For any two individuals in a group, it may be significant to inquire into the extent of agreement in their expressed choices, apart from their mutual responses. This agreement corresponds to the angle between their row vectors. We consider that their non-mutual choices are represented by vectors in an  $(N-2)$ -dimensional space. If their choices are identical, the vectors are the same, if choices are independent in the statistical sense, the vectors are at right angles and if choices are exactly opposite, so are the vectors. It is convenient, then, to express this relationship in terms of the correlation coefficient with the usual interpretation, since that coefficient corresponds to the cosine of the angle between the vectors.

#### SUMMARY

The matrix of responses is suggested as a more powerful tool in the analysis and interpretation of sociometric data. It appears that there is certain implicit information in the sociometric test which the sociogram is impotent to exploit. It is hoped that the matrix will be more useful in extracting this information.

A number of matrix processes have been considered and it has been shown that each formal result has its counterpart in an interpretation in the sociological sense. Again, it is hoped that further algebraic processes can be identified with social processes or the results with social phenomena.

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## THE *TELE*-FACTOR: HORIZON AND AWARENESS

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Sociometry, as originally conceived by Moreno,<sup>1</sup> has shown that interpersonal structures develop and operate in a characteristic way that is related to, but not identical with their emotional determinants. Moreno holds that *tele*,<sup>2</sup> a projection of feeling, provides the basis upon which one individual chooses another as his friend. [In a recent treatment of the subject, Jennings<sup>3</sup> has differentiated between *psychetele* and *sociotele*. *Psychetele* is the motivating factor of the choice process in such social structures in which the association of member to member is a purely personal matter (the psychogroup). *Sociotele* is the motivating factor of the choice process as it operates in social structures built around the production of an article or the giving of a service (the sociogroup).]

In any case, the specific structure of any given group is the result of this process of choice, of preference and rejection of member by member. Where group structure becomes an object of inquiry, under the terms of the sociometric test, it is necessary to know the choices made by each member and whether or not these choices are reciprocated. In this way, as Jennings<sup>4</sup> points out, sociometry grants each subject as the ultimate authority on social relationships of which he is a part, the totality of which Moreno designates the social atom.

Yet, some investigators feel that experience with the sociometric test shows that, for whatever reason, a subject may not always be accurate about his own social atom, making unreal choices and capricious claims of friendship. Is it true, then, that individuals, as a rule seek friendships with those who accept them? The *tele* theory indicates that, by and large, they should, since *tele* has been defined, by Moreno, as an interpersonal sensitivity that is responsible for the trend toward mutuality of choice that far surpasses chance possibility.<sup>5</sup> That *tele* is an objective factor, something purely apart

<sup>1</sup>J. L. Moreno, *Who Shall Survive?*, Beacon House, New York, 1934.

<sup>2</sup>J. L. Moreno, *op. cit.*, pp. 16, 74, 215; also, Contributions of Sociometry to Research Methodology in Sociology, *American Sociological Review*, XII: 287-292, 1947.

<sup>3</sup>H. H. Jennings, *Sociometry of Leadership*, Sociometry Monographs, No. 14, Beacon House, New York, 1947; H. H. Jennings, Sociometric Differentiation of the Psychogroup and the Sociogroup, *SOCIOMETRY*, X: 71-79, 1947.

<sup>4</sup>H. H. Jennings, Editorial, *SOCIOMETRY*, X:10, 1947.

<sup>5</sup>J. L. Moreno and H. H. Jennings, *Sociometric Measurement of Social Configurations*, Sociometry Monographs, No. 3, Beacon House, New York, 1945, pp. 24-27.

from the emotional ones, is held the reason that configurations develop clicking and chain formation to the degree above chance that they do. Thus, it is proposed that each group has its chance level and its *tele* level of mutuality, and that the distance between the two is the index of the distortion of *tele* by emotional processes. The *tele*-factor may then be isolated as the characteristic ability of the given individual to create and to enter into mutual social relationships.

Jennings<sup>6</sup> demonstrated that the volume of choice expression of which any person is capable falls within relatively fixed limits. It may then be inferred that the amount of *tele* possessed by any individual is (1) discrete, and, (2) fairly constant. These results were confirmed in a previous communication<sup>7</sup> in which it was also shown that choice expenditure is (3) adequate<sup>8</sup> in the sense that choices are always invested to their limit. Thus, it was found that subjects compensated a decreasing number of interpersonal contacts by increasing the intensity of those contacts remaining to them. Because this investment is forced, the individual may be pushed into making choices in situations from which he derives no return. If this can be shown to be true the *tele* theory is not tenable. The theory stands or falls on the demonstration that *tele* operates with (4) awareness—not necessarily on the level of conscious perception—making for the investment of choice in such fashion that reciprocation is greater than that expected from chance expenditure of choice.

There has been some consideration in previous investigations of this question of the "accuracy" of the choice process. (The distinction that Jennings has made between psychegroup and sociogroup was at least to some extent occasioned by her observation that there is less mutuality in the latter, and that *sociotele* expression may more often be towards those members occupying a position of high status in the group. The member of the sociogroup wants to be with those others who can transmit status to him, in this way placing the value of his companionship on a level of usefulness. This pattern of choice expenditure is to be observed in dominance structures<sup>9</sup> of all sorts, giving them a certain deceptive appearance as psyche-

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<sup>6</sup>H. H. Jennings, *Leadership and Isolation*, Longmans, Green, New York, 1943.

<sup>7</sup>P. Deutschberger, Interaction Patterns in Changing Neighborhoods, *SOCIOMETRY*, IX:303-315, 1946.

<sup>8</sup>P. Deutschberger, Adequacy and Conservation in Adjustment, *Psychiatry*, IX:109-116, 1946.

<sup>9</sup>P. Deutschberger, The Structure of Dominance, *American Journal of Orthopsychiatry*, XVII:343-351, 1947.

groups that has long mislead the thinking about them. Jennings found that in the psychegroup, where members value each other as persons, there is an apparent greater accuracy in the choice process with a higher degree of mutuality.)

This paper reports an investigation of the accuracy of the choice process as observed over a three month period in which 326 adolescents, mean age 17 years, of both sexes. All lived in Pittsburgh, the majority attending The Squirrel Hill Youth Council "Hangout", a teen-age canteen where most of the sociometric testing was done.<sup>10</sup>

The unrestricted sociometric test was given to each of the subjects:

This is a test of how you spend your free time—that is, when you are not working (or going to school). Make a list of the names of your best friends. You can put down as many or as few names as you wish.

Write after each name about how much of your free time you spend with that person. Don't give numbers. Just say whether it is *much*, *medium*, or *little*.

Now show which of these friends go with one another. If all the people on your list go with one another, put A's before all the names. If some go with some, and others with others, put A's for one set, B's for another, C's for another, and so on. If you find that a person goes into more than one set, give him as many letters as necessary. Finally, if you find that somebody does not go with anybody else on your list, put an X before the name. Now check your list to see that there is at least one letter before each name.<sup>11</sup>

The names of individuals not interviewed were eliminated from each list, and from the revised lists the following data were derived: (1) the total number of choices involving the 326 persons interviewed; (2) the total number of choices reciprocated; (3) the number of choices reciprocated according to the level of the original choice; (4) the number of choices reciprocated according to the position of the recipient within the chooser's range of choice; (5) the number of choices reciprocated according to both level and position.

A choice was counted "reciprocated" whether or not the level of reciprocation was equivalent to that of the original choice. By "level" is meant the particular time designation of *much*, *medium*, or *little*; by "range", all choices made by any given subject; and, by "position", that part of the

<sup>10</sup>This experiment was made possible by Irving Canter, Irene Kaufman Center, and by Norton Mandelbaum, Pittsburgh, A.Z.A.

<sup>11</sup>P. Deutschberger, *op. cit.*, SOCIOMETRY, IX:306.



range differentiated into high and low. The individual or group with whom the subject spends the greatest portion of his leisure time constitutes the high part of his range (R), the rest being in the low part (R'). R may be computed from the unrestricted sociometric test by finding that letter yielding the highest value for:

$$\frac{5a + 3b + c}{N}$$

N

where: "a" is any choice at the level of *much*; "b", *medium*; "c", *little*; "N", the number of individuals in the set. For the purposes of this study, should the subject have elected an equal amount of time with a group and with an individual (X), the latter was given preference as R. Was there an equal distribution among groups, preference was given to the first mentioned.

Using reciprocation of choice as the criterion, the "awareness" of each subject in naming another as his friend was determined for: (1) the undifferentiated range; (2) level of original choice; (3) the differentiated range. These data were tabulated by sex of subject and according to frequency of reciprocation, and compared for percentage of choice expended.

In all, 1006 choices were distributed among the 326 revised lists, with two-thirds being reciprocated. This is significantly greater than chance, since the theoretical probability that any choice be reciprocated is one-half.

TABLE 1: FREQUENCY OF RECIPROCATION BY RANGE AND LEVEL OF 1006 CHOICES:  
ALL SUBJECTS\*.

	Range	Level	Frequency	Per Cent
1.	R	Much	.894	40.2%
2.	—	Much	.838	50.3%
3.	R	—	.830	61.4%
4.	R	Medium	.732	17.4%
5.	—	—	.656	65.6%
6.	R'	Much	.614	10.0%
7.	R	Little	.605	3.8%
8.	—	Medium	.509	39.5%
9.	R'	—	.374	38.6%
10.	R'	Medium	.333	22.1%
11.	—	Little	.330	10.2%
12.	R'	Little	.169	6.5%

\*Dash indicates undifferentiated range or combined levels.

A choice on the level of *much* possessed a greater probability of reciprocation than choices of *medium*, which in turn were more likely of reciprocation than choices to the extent of *little*. The odds are seven to one that a choice on the level of *much* would be mutual as compared to two

to one against reciprocation for a choice of *little*. Half of all the choices exercised by the subjects were to the extent of *much*, while ten percent were of *little*. On the level of *medium*, where the empirical probability of reciprocation was equivalent to the theoretical, about forty percent of all the choices were expended.

Generally, a choice in R possessed a greater chance of reciprocation than choices in R', and sixty-one percent of all choices were in R. The chances for reciprocation of a choice in R were about equal to those on the level of *much*, but a choice combining both attributes had better than an eight to one probability of reciprocation, and forty percent of all choices fell into this category. Twenty-nine percent of all choices (R'*medium* plus R'*little*) were expended in situations in which the odds were definitely against reciprocation.

TABLE 2: FREQUENCY OF RECIPROCATION BY RANGE AND LEVEL OF 266 CHOICES MADE BY GIRLS TO GIRLS.\*

	Range	Level	Frequency	Per Cent
1.	R	Much	.952	47.0%
2.	—	Much	.908	57.1%
3.	R	—	.900	63.9%
4.	R	Medium	.820	36.4%
5.	—	—	.774	77.4%
6.	R	Little	.714	2.6%
7.	R'	Much	.704	10.2%
8.	—	Medium	.660	14.3%
9.	R'	Medium	.554	21.1%
10.	R'	—	.552	36.1%
11.	—	Little	.300	7.5%
12.	R'	Little	.077	4.8%

\*Dash indicates undifferentiated range or combined levels.

Of 266 choices made by girls to girls, about three-quarters were reciprocated. The odds are nine to one that a choice on the level of *much* would be reciprocated as compared to seven to three against mutuality on the level of *little*. More than half the choices were made to the extent of *much*, while eight percent were of *little*. R possessed about the same frequency of mutuality as did choices to the *much* level, and the majority of the choices in this part of the range were to the extent of *much*. The odds for reciprocation were about even for R' with the majority of choices expended in this range to the extent of *medium*. Five percent of all the choices of girls by girls (R'*little*) were invested in situations in which the odds were definitely against reciprocation.



TABLE 3: FREQUENCY OF RECIPROCATATION BY RANGE AND LEVEL OF 674 CHOICES MADE BY BOYS TO BOYS.\*

	Range	Level	Frequency	Per Cent
1.	R	Much	.866	38.7%
2.	R	—	.822	61.7%
3.	—	Much	.806	49.0%
4.	R	Little	.750	3.6%
5.	R	Medium	.710	19.4%
6.	—	—	.635	63.5%
7.	R'	Much	.580	10.2%
8.	—	Medium	.487	40.6%
9.	—	Little	.406	10.2%
10.	R'	—	.332	38.3%
11.	R'	Medium	.285	21.4%
12.	R'	Little	.249	6.7%

\*Dash indicates undifferentiated range or combined levels.

More than half of the 674 choices made by boys to boys were reciprocated. The odds are in favor of reciprocation of any choice in R or of *much* by about four to one; against reciprocation of an R' by two-thirds, of *little* by three-fourths. About half the choices given were to the extent of *much*, and more than half were in R, while twenty-nine percent of all choices were expended in situations in which the odds were definitely against reciprocation.

Less than seven percent of all choices submitted were between boys and girls, and such choices of opposite sex are tabulated separately. Of 66 choices, two-fifths were reciprocated as compared to a one-half chance expectancy.

TABLE 4: FREQUENCY OF RECIPROCATATION BY RANGE AND LEVEL OF 66 CHOICES TOWARD OPPOSITE SEX.\*

	Range	Level	Frequency	Per Cent
1.	R	Much	.895	28.8%
2.	—	Much	.830	36.4%
3.	R	Medium	.667	10.0%
4.	R	—	.625	48.5%
5.	R'	Much	.600	7.6%
6.	—	—	.394	39.4%
7.	—	Medium	.214	42.4%
9.	R'	Medium	.091	33.3%
10.	—	Little	.000	21.2%
11.	R	Little	.000	10.4%
12.	R'	Little	.000	10.2%

\*Dash indicates undifferentiated range or combined levels.

Forty-four percent of all choices made toward a subject of the opposite sex (R'*medium* plus R'*little*) had very small chance of reciprocation. The division of choices was equal between R and R', the degree of mutuality

being slightly better than chance for R, much below chance for R'. However, where a choice was to the extent of *much* and in R there was nine to one in favor of its being reciprocated. Where twenty-nine percent of the choices exercised were in this category, seventy-one percent were expended in situations in which the mean frequency of reciprocation was .272.

Generally speaking, there is a greater degree of reciprocation among girls in the age range studied than among boys. That is to say, there is a greater awareness of actual friendships (in terms of mutuality) among girls than among boys, but both are able to discriminate friendships with members of the same sex to a point significantly beyond chance. The awareness of friendship, in this age range, with a member of the opposite sex seems more restricted, and although such choices are not frequently made, the relationships indicated by the subjects were, in the majority, "unreal" in the sense that they were not often reciprocal. Where the majority of the choices in R were to the extent of *much* with a high empirical probability of reciprocation, the greater portion of R' was comprised of choices to the extent of *medium* and *little*.

In regard to choices between the sexes, the ones in R were not as highly reciprocated as those to the extent of *much*. The twenty-nine percent of the choices that were to the extent of *much* and in R, highly reciprocated as they were, came from subjects beyond the age of sixteen. This would indicate that there is an age as well as sex differential in the patterning of the responses.

These findings support the *tele* theory as developed by Moreno. In their interpersonal relationships individuals behave in such a way as to suggest an objective awareness and sensitivity to their acceptance by others. That is to say, the highest levels of choice are invested in situations from which there is definite return. More tentative levels, as well as token choices, are expended in situations where reciprocation is hit-or-miss, or where the empirical probability of mutuality is not very great. In this way an element of protection against hurt from a negative attitude on the part of the recipient is provided, since not so much is tied up in these choices.

The pattern of the choices and their reciprocation that appears in the population studied indicates too that, at least for psychegroups among adolescents, the operation of *tele* is not equal throughout the given social atom. The differences between R and R' would imply that the former acts as an horizon within the social atom in which awareness is great, level of choice expenditure high, and perception of inter-relationships accurate. For this reason, it is proposed that R be known as the high-*tele* range, and R' as the low-*tele* range.

The low-*tele* range shows many of the characteristics of that which Lewin<sup>12</sup> has called a "cognitively undetermined region", in that its structure is not sufficiently articulated for the individual. This is the area between the chance level and the *tele* level wherein drives for acceptance and mis-perceptions about the role of the recipient may cover a range of pathological interpersonal relationships.

It may be speculated that this horizon of awareness constitutes a norm varying for each individual and conditioning his perception of interpersonal relationships. Although the social atom is structurally determined by the individual's need, the occasion to indulge this need, and all the personal and cultural values around friendship and acceptance, there is only a certain range within which judgment is accurate, and beyond which relationships may be over-valued or under-valued<sup>13</sup>.

These conclusions would also suggest, in the light of Jennings' findings on the psychegroup and sociogroup, that the structure of the psychegroup is for the individual member a matter of apperception while the structure of the sociogroup is for the individual member a matter of direct perception with the horizon of awareness greatly restricted and with a more extensive low-*tele* range.

#### SUMMARY

Interpersonal relationships develop and operate in a way suggesting the agency of an objective factor above and beyond emotional determinants. This factor is called *tele* and is defined as the characteristic ability of a given individual to create and to enter into mutual social relationships. Normally, *tele* follows the principles of (1) discreteness, (2) constancy, (3) adequacy, (4) awareness; that to say, for each individual it is limited in amount, it remains static in volume over periods of time, it is always invested to its limit through interpersonal choice, and it is expended in the direction of bringing return. Distinct age and sex patternings appear in its expenditure. *Tele* does not operate equally throughout the totality of an individual's social atom, but consists of an horizon in which awareness is great, level of choice expenditure high, and perception of inter-relationships accurate; and an unstructured region, marked by tentative and token choices to which reciprocation is hit-or-miss. (*Psychetele* is more accurate than *socio-tele*, and it is speculated that a greater amount of conscious perception and emotional drive for acceptance goes into the latter.)

<sup>12</sup>K. Lewin, *Principles of Topological Psychology*, McGraw-Hill, New York, 1936, pp. 130-135.

<sup>13</sup>M. Sheriff, *The Psychology of Social Norms*, Harper, New York, 1936.

## SOCIOLOGICAL LAW AND THE DEVIANT CASE

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One of the most warmly discussed subjects in the field of the methodology of the social sciences is the meaning or the significance of the deviant or non-conforming case in a correlation table, or a statement of regularity, frequency, or general lawfulness. Unfortunately, the semantic structuring of the two concepts (divergence and regularity) gives them an opposing appearance which has led some social scientists to conclude fallaciously that they are in some way contradictions of each other, or that the acceptance of one concept calls for the rejection of the other. Accordingly, the acceptance of one or the other horns of the postulated dilemma is declared to imply the concomitant acceptance or rejection of mutually exclusive methodological systems. Two well-known social scientists, Kurt Lewin and Florian Znaniecki, have, in line with these beliefs, called for the acceptance of new methods of social study. Lewin calls his system "The Galileian Mode of Thought," while Znaniecki's is named "The Method of Analytic Deduction." Both arise out of the inability of their originators to reconcile the idea of deviance with that of relative regularity, or what they would both (mistakenly) call "partial lawfulness." It is the purpose of this writer to attempt to show that the inability of these men to reconcile the two concepts, and the resultant theoretical structure of their new methodology is based on a rather simple fallacy concerning the nature of a statement of relative regularity, frequency, or correlation.

Since it is Lewin who makes more explicit the assumptions underlying his conceptual scheme, we shall turn first to his exposition.<sup>1</sup>

Lewin derives his term "Galileian" (or sometimes "Post-Galileian") from his division of methodology in the science of physics (the initial science) into two periods—one dominated by the methodological principles enunciated by Aristotle, the other typified by concepts which presumably originated with Galileo and were developed in the period following his death

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<sup>1</sup>Lewin is, of course, a psychologist, and his attack is directed expressly at methodology in the field of psychology, but by implication it is obviously meant to extend through the whole realm of the social sciences. One may substitute the words sociology or sociologists for psychology and psychologists throughout the entire discourse. The passages to be quoted will be found in Kurt Lewin's *A Dynamic Theory of Personality*, McGraw Hill, New York and London, 1935.

and which now govern the science of physics. The methodological difference of the two with which this paper is concerned is stated to be somewhat as follows: Aristotelian physics assigned causality only to occurrences which were repeated frequently or regularly, while post-Galileian physics assumes causality to exist everywhere and at all times, and therefore is concerned just as much with the causality of a unique or infrequently occurring physical event as with the causality involved in a frequency statement or a correlation. Lewin expositis the Aristotelian point of view as follows:

For Aristotle those things are lawful, conceptually intelligible, which occur *without exception*.<sup>2</sup> Also, and this he emphasizes particularly, those are lawful which occur *frequently*. Excluded from the class of the conceptually intelligible as mere chance are those things which occur only *once*, individual events as such. . . . The real source of this conception may lie in the fact that for Aristotelian physics not all physical processes possess the lawful character ascribed to them by post-Galileian physics. To the young science of physics the universe investigated appeared to contain as much that was chaotic as that was lawful. The lawfulness, the intelligibility of physical processes was still narrowly limited. It was really present only in certain processes, for example, the courses of the stars, but by no means in all the transitory events of the earth. . . . In other words, the ambition of science to understand the complex, chaotic, and unintelligible world, its faith in the ultimate decipherability of this world, were limited to such events as were certified by repetition in the course of history to possess a certain persistence and stability.<sup>3</sup>

Pointing out that post-Galileian or modern physics rejects these assumptions and assumes universal causality, Lewin then turns to his attack on modern psychology:

The concept formation of psychology is dominated, just as was that of Aristotelian physics (he asserts) by the question of regularity in the sense of frequency. This is obvious in its immediate attitude toward particular phenomena as well as in its attitude toward lawfulness. If, for example, one shows a film of a concrete incident in the behavior of a certain child, the first question of the psychologist usually is "Do all children do that, or is it at least common?" And if one must answer this question in the negative the behavior involved loses for that psychologist all or almost all claim to scientific interest. To pay attention to such an "exceptional case" seems to him a scientifically unimportant bit of folly.<sup>4</sup>

<sup>2</sup>Italics as in original.

<sup>3</sup>*Op. cit.*, 6-7.

<sup>4</sup>*Ibid.*, 13.



Lewin continues his accusation:

The individual event seems to him (the modern psychologist) fortuitous, unimportant, scientifically indifferent. It may, however, be some extraordinary event, some tremendous experience, something that has critically determined the destiny of the person involved, or the appearance of an historically significant personality. In such case it is customary to emphasize the "mystical" character of all individuality and originality, comprehensible only to "intuition," or at least not to science.

These attitudes toward the particular event lead to the same conclusion: That that which does not occur repeatedly lies outside the realm of the comprehensible.<sup>5</sup>

Thus modern psychology (and by implication, sociology) is condemned because its concept of causation is apparently not rigorous enough.

The conviction that it is impossible wholly to comprehend the individual case as such implies a certain laxity of research: It is satisfied with setting forth mere regularities. The demands of psychology upon the stringency of its propositions go no farther than to require a validity "in general," or "on the average," or "as a rule." The "complexity" and "transitory nature" of life processes make it unreasonable, it is said, to require complete exceptionless validity. According to the old law that "the exception proves the rule," *psychology does not regard exceptions as counter-arguments so long as their frequency is not too great.*<sup>6</sup>

The attitude of lawfulness also shows clearly the Aristotelian character of its mode of thought. It is founded on a very meager confidence in the lawfulness of sociological events and has for the investigator the added charm of not requiring too high a standard of validity in his proposition or in his proofs of them.<sup>7</sup>

Lewin then goes on to expound the nature of the conceptual revolution in physics which he asserts is now needed in psychology:

The Aristotelian concepts show, as we have seen above, an immediate reference to the historically given reality and to the actual course of events. This immediate reference to the historically given is lacking in modern physics. The fact, so decisively important for Aristotelian concepts, that a certain process occurred only once or was very frequently or invariably repeated in the course of history, is practically irrelevant to the most essential questions of modern physics. This circumstance is considered fortuitous or merely historical.

The law of falling bodies, for example, does not assert that the

<sup>5</sup>*Ibid.*, 13-14.

<sup>6</sup>Italics as in original.

<sup>7</sup>*Ibid.*, 18-19.

event to which the formula  $S = \frac{1}{2} gt^2$  applies, the "free and unimpeded fall" of a body occurs regularly or even frequently in the actual history of the world. Whether the event described by the law occurs rarely or often has nothing to do with the law. Indeed, in a certain sense, the law refers only to cases that are never realized, or only approximately realized, in the actual course of events. Only in experiment, that is, under artificially constructed conditions, do cases occur which approximate the event with which the law is concerned.<sup>8</sup>

The consequences of this point of view for modern physics (and modern psychology) are stated to be as follows:

When lawfulness is no longer limited to cases that occur regularly or frequently but is characteristic of every physical event, the necessity disappears of demonstrating the lawfulness of an event by some special criterion, such as its frequency of appearance. Even a particular case is then assumed, without more ado to be lawful. Historical rarity is no disproof, historical regularity no proof of lawfulness. For the concept of lawfulness has been quite detached from that of regularity; the concept of the complete absence of exceptions to laws is strictly separated from that of historical constancy.<sup>9</sup>

Turning now to Znaniecki, we find that he makes the same type of attack on the social sciences—this time particularizing sociology. His own method of analysis he calls "analytic induction" which is contrasted with what he asserts is the prevalent and fallacious methodology of "enumerative induction"—a term which we might equate with Lewin's "Aristotelian." As in the former case, his charge is that this method does not produce exceptionless laws:

This is why sociology, since it has been trying to be inductive, has usually been satisfied with looking in any given class for relatively prevalent<sup>10</sup> characters rather than for common and distinctive characters, and has formulated "approximate" generalizations of the same type as popular common-sense reflections, that is, generalizations applying to "many" or "most," but not to all the objects or processes of a certain class as distinct from other classes. Every generalization found in older sociology that is not deduced from premises arbitrarily created or borrowed from some other discipline explicitly or implicitly admits exceptions.<sup>11</sup>

In another characteristic passage, Znaniecki complains of the im-

<sup>8</sup>*Ibid.*, 12.

<sup>9</sup>*Ibid.*, 26.

<sup>10</sup>Italics as in original.

<sup>11</sup>*The Method of Sociology*, Florian Znaniecki, Farrar & Rinehart, Inc., New York, 1934, p. 224.

possibility of arriving by enumerative induction at judgments of the type "all S are P," or rather "if p, then q." Whenever such judgments can be formulated, the use of the statistical method is precluded.<sup>12</sup>

Enumerative induction, he asserts, cannot deal with the exception:

The exception is . . . an essential instrument of scientific progress. But it is this only because it is not meekly accepted in advance as a necessary limitation, imposed by facts upon the logical perfection of the theory and which forces the scientist to substitute approximate instead of exact judgments. Truly creative science does not admit that any empirical obstacles can prevent it from performing its proper function; and this function consists in rationalizing realities, constructing perfectly coherent systems of abstract and general concepts by which concrete and particular data are classified and explained. Science is reason challenging experience and forcing it into a rational order. An exception is a revolt of experience against reason. Statistical science, faced with such a revolt, passively relinquishes its claims and withdraws from the struggle into the realm of pure mathematical concepts, there to weave into arbitrary patterns (without any further interference from the real world) whatever shreds of theory experience has left of it. Creative science—physics, chemistry, biology—to subdue this revolt invents new weapons and either supplements or supplants the theory that has met with the exception by a new theory as radical, or more radical, in its claims, and thus turns defeat into victory strengthening and widening the sway of reason.<sup>13</sup>

In proceeding now to an analysis of the point of view expressed in these passages by two well-known social scientists, the writer would like to make it clear that he has no wish to take a ride on that well-worn teeterboard of a question usually put in the form of "the Case-Method Versus The Statistical, but The Other Has A Definite Place in The Social Sciences If Used Discreetly and Sparingly." Let the writer assert that he believes in both and let us go on from there. There is under consideration an attack on the so-called statistical, or correlation, or frequency method which we believe to contain some astonishing fallacies. Let us see what they are.

In the first place both Lewin and Znaniecki accuse the modern users of the so-called "Aristotelian" or "enumerative induction" method of postulating a universe in which the principle of causation is only partially operative. A glance back at the passages already quoted will make this obvious, but we can even find the accusation made in its pure form:

The esteem in which frequency is held in present-day psychology is due to the fact that it is still considered a question whether, and if

<sup>12</sup>*Op. cit.*, 232.

<sup>13</sup>*Ibid.*, 233-4.



so, how far, the psychical world is lawful, just as in Aristotelian physics this esteem was due to a similar uncertainty about lawfulness in the physical world.<sup>14</sup>

Now we need not be concerned as to what Aristotelian physics assumes about the world. That is a question for the classically inclined physicist to determine.<sup>15</sup> But if Lewin and Znaniecki are talking about present-day science when they attack a belief in limited lawfulness, they are waving a stick at a very defunct horse indeed. It is the firm contention of this writer that no serious and well-grounded student of the modern sciences, natural or social, assumes anything but a universe in which all events have a causal antecedent—a view which makes the discovery of lawfulness theoretically dependent only on a complete knowledge of the prior relevant factors and their interrelationships. Any other view would not only provide a well-deserved target for the Messrs. Lewin and Znaniecki to take pot-shots at, but would also deny the foundations of all modern scientific achievement and inquiry. In the words of R. M. MacIver:

Causation is thus, axiomatically, universal. Were there any gaps in it, any failure of it, its existence anywhere would be impugned. Where it failed, things would cease to be things. A thing would at the same time in the same relation be itself and something different from itself. The primary postulate of all our reasoning, all our science, all our practice, would be challenged.<sup>16</sup>

In short, the assumption of universal causation or lawfulness is by no means an exclusive possession of Lewin, Znaniecki, or the modern physicists. It is held by the most statistically inclined operationalists (wrong though they may be in other respects) and is perfectly consistent with the search for frequencies and correlations. What troubled Lewin and Znaniecki was that they could not reconcile this principle of universal lawfulness with the undeniable fact that most psychological and sociological generalizations are only relatively valid and admit of exceptions. And so they leaped to the conclusion that the seeker after correlations and frequencies was denying the universal presence of lawfulness and taunted him with being unable to deal with the deviant case or the exception. A more careful analysis of both the logic of the statistical method and the nature of social action would have saved them from this fallacy. Let us see why.

<sup>14</sup>Lewin, *op. cit.*, 14.

<sup>15</sup>As a matter of fact, the Lewin interpretation of the Aristotelian system with regard to lawfulness is somewhat open to doubt.

<sup>16</sup>*Social Causation*, Ginn & Co., 1942, Boston, p. 31.

In the first place, if we analyze the content of a law of the type which Lewin and Znaniecki propose to obtain—a law admitting of no exception—we find that in the natural sciences it consists of a prediction that if, let us say, factors  $f_1, f_2, f_3$  are combined under conditions  $c_1$  and  $c_2$ ,  $R$  would be the result. This means, of course, that  $f_1, f_2, f_3$  and  $c_1$  and  $c_2$  are perfectly known and are in their pure state. Now in the social sciences which deal with man, we must deal not only with tangible factors such as immediate stimuli, but with internal states which are called attitudes, and, in addition, we must consider not just the mechanical juxtaposition of all these elements, but their interaction. Let us, however, dismiss for the moment the difficulty of reducing attitudes and modes of interaction to precise formulation, and assume that these difficulties have been overcome. We will then call the elements of a social law  $s_1, s_2, s_3 \dots a_1, a_2, a_3 \dots$  and  $I$ , and, for convenience sake, refer to them all as factors. Znaniecki and Lewin would then ask us why we cannot have an exceptionless law of the natural science type—a law which might read, for instance  $(s_1 s_2 a_1 a_2)_1 = R$  (without exception). The answer seems to this writer quite obvious, but apparently it needs to be stated again. Whereas in a chemical or physical experiment it is possible in many cases to control and identify all of the relevant factors; in dealing with the causes of a psychological or social action—in other words, an action involving human beings, we never know what all the factors (the  $s$ ,  $s$ , the  $a$ ,  $a$ , and the  $I$ ) are, and those we can identify we seldom have in a pure state. If the methodological purists accuse us of taking refuge in the convenient and admittedly well-worn phrase of “the complexity of life processes,” one can only reply that this complexity is not our creation. It is there, and the social scientists must face the consequences of its presence.

What then does the average psychologist or sociologist mean when he makes a generalization which admits of exceptions or deviants—such a statement, for instance, that—If a mentally dull child grows up in a slum area, in a broken family, and under the domination of an asocial and habitually drunken father, he is very likely to become a delinquent. Superficially, this statement has the symbolic structure  $F_1 F_2 F_3 = R$ . Actually, however, these  $F$ s are not pure  $F$ s and may not be the only  $F$ s which are present in the situation being studied. For instance  $F_1$ —the capacity of the child—which we have characterized as “dull mentality” may be alloyed with a pronounced manipulative gift which enables the child to become an outstanding carpenter, and thus escape the  $R$  (delinquency) of the formula. Or  $F_3$ —the broken family—may contain an older well-adjusted sister who

has a pronounced socializing effect on the child, outweighing the absence of the mother and the asocial qualities of the father. And so on. And finally, there may have been additional Fs or influences which the investigator did not anticipate at all. Of course, by making the factors in his formula more numerous and more precise, the investigator may be able to *reduce* the number of deviants or exceptions to his generalization. And this fact makes the nature of the implication of the deviant case quite clear. Its presence does *not* indicate that here causality or lawfulness has failed. It simply means that all the relevant factors in the situation have not been controlled or discerned. The number or percentage of deviant cases to the generalization, then, indicates the degree of control, identification, and purification, or knowledge about the factors (I am still aware of the too simplified nature of the term) which are relevant to the production of the result predicted in the generalization. The implication is always present (and certainly fully realized by the social scientist of any degree of competence whatsoever) that if all the relevant factors were known, the deviant cases could be explained by another law and the first generalization be qualified so as to become exceptionless.

From this point of view, one might inquire—Well, even if the reasoning of Znaniecki and Lewin about the so-called statistical method has been fallacious, cannot one arrive at their goal—exceptionless laws in the social sciences—by using the statistical method and ascertaining all the relevant factors for the causation of a particular result R. The answer, in this writer's opinion is No.<sup>17</sup> The object of study in the social sciences—the human being is not a chemical element which remains relatively constant and can be explained in terms of a small number of factors. The human being is a many-faceted creature whose any given action is, in the last analysis, related to a web of innumerable previous experiences and the interaction of these experiences with the innumerable elements in his hereditary makeup. Complete control and knowledge of all the factors in such a situation is obviously impossible. The search for generalizations about social life, then, must inevitably be asymptotic. That is, it must aim at being non-exceptionless, but must realize that it will never reach this goal—not because social life defies the existence of causation and lawfulness—but because there are too many elements in the causal process for all of them to be discerned and controlled. All the social scientist can hope to do is to select or discover the more important factors in the almost limitless hierarchical layer

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<sup>17</sup>And this opinion would apply also to the problem of causal imputation in a single case.

of causes which support a given effect and state his discoveries in the form of generalizations which are more or less true (the more true, the better, of course).

Seen in this light, then, the search for frequencies or repetition which Lewin and Znaniecki so much deplore, becomes quite meaningful. *It is a search not for the presence or non-presence of causality in a particular situation, but an attempt to discover the particular elements which are causally related.* It is, to be sure, only a first step, since the frequency or correlation must be explained in psychologically intelligible terms. And it never can give us an exceptionless law. But the point is that it is often a necessary first step in reducing to some sort of order the incessant interweavings of the innumerable elements which combine to produce social action.

And from this point of view, also, an investigator's unwillingness to deal with some *particular* individual case or some unique historical event may be quite understandable. It is not that he denies causality or lawfulness to it, as Lewin and Znaniecki asserted, but he may decide that (in spite of the opportunity to study it intensively) the causal imputation or the relation of causally connected elements is too difficult here because of his necessarily imperfect knowledge of these elements. Or he may come to the conclusion that the combination of elements which probably produced the event will never be repeated—in which case, the law to be formulated would have little bearing on human conduct in general. Or he may despair of his ability to convince his colleagues that his own causal interpretation of the case is the correct one.<sup>18</sup>

In conclusion, we must point out again that this paper has not been a discussion of the correlation method versus the case method. We have simply attempted to prove that the attack of Znaniecki and Lewin on generalizations in the social sciences which admitted of exceptions was ill-founded. We have made this attempt by showing that the generalization and the deviant case are warp and woof of a sound and consistent methodology. And if the methodological purists will cavil at our apparent content to stop short of the discovery of an immutable exceptionless sociological law—we can only point out that the creation of a truly complex world of human affairs somewhat antedated the inception of their commendable search for a comfortable but unattainable sociological certainty.

<sup>18</sup>A whole new problem is raised here—the problem of the communication of causal imputation. See, for instance, the Blumer criticism of the Thomas-Znaniecki analysis of case material in *The Polish Peasant*. Herbert Blumer, "An Appraisal of Thomas Znaniecki's *The Polish Peasant in Europe and America*," *Social Science Research Bulletin* 44.

## THE MEASUREMENT OF GROUP INTEGRATION†

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In the analysis of group structure the sociometric test has so far been most fruitfully employed as an instrument for the treatment of choice volume, that is, the gross number of choices given out or received by an individual or group without regard to the patterns which can be differentiated within these choice totals. This seems to be a necessary starting point for structural analysis, since such volume is more easily handled statistically in view of the fact that single choices represent simpler probability functions than do any patterns of choices. Patterns can be made up of different combinations of choices and therefore introduce statistical problems which become more complex with increase in the number of elements in the patterns. Nevertheless the use of such compound data is a typically sociometric procedure. It does not require that the responses of two or more persons be measured separately and then combined in some way. Instead, their interpersonal relationship is directly measured.

This suggests that experimental findings should be increasingly analyzed into units larger than the single choice. A typical structural investigation might be to determine the curve describing the relationship between degree of reciprocation existing in a work group and the group's morale or efficiency. Reciprocation could also be used as one measure of cleavage between subgroups in a population, cleavage being indicated by low intergroup as compared with high intragroup reciprocation. Reciprocation might also be a function of time, with a curve expressing the relationship between mutuality and the length of a group's life together.<sup>1</sup> Another type of experiment concerns leadership: employees might choose supervisors to work under on certain projects and supervisors choose employees for the same projects, with a subsequent determination of the amount of reciprocation existing between supervisory and subordinate personnel.

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†The opinions and assertions in this paper are those of the writer and are not to be construed as official or reflecting the views of the Navy Department or the Naval service at large.

<sup>1</sup>For an interesting consideration of time in relation to choice phenomena, see J. L. Moreno, Helen H. Jennings, and Joseph Sargent, *Time as a measure of inter-personal relations*. Sociometry Monograph No. 13, 1946; or see SOCIOMETRY, Vol. III, No. 1, pp. 62-80, January, 1940.



In order to obtain a rounded picture of structure, such experiments could be carried out under a variety of choice requirements. The arrangement of the group may be conceived of as satisfying certain specific needs, a given arrangement depending on which need is uppermost during a certain period. In a section of clerical employees, for example, individuals may be observed to arrange themselves differently according to whether they are proofreading, eating lunch, or having a rest period. Similarity but not perfect correlation may be expected between arrangements under differing conditions. From such considerations has sprung the practise of using the sociometric test with more than one criterion of choice.<sup>2</sup>

In these experiments probably the order of analytic procedure would be to determine first the measures of such masses as the group's distribution of choices within itself, or to itself and to another group, next attempting further to differentiate these areas in terms of reciprocal pairs, finally identifying larger patterns such as cliques or networks. Such progressive differentiation holds interesting possibilities which can only be touched on in the present article. In this paper current methodology will be described and a few additional techniques proposed.

The measurement of reciprocation of choice began in Moreno's work (7) as a determination of the percent of reciprocated choices in school classes and a tracing of age increase in such structures. Similar results were obtained later by Criswell (3). In these early studies age increase showed up in spite of the fact that no adjustment was made for size or race-sex composition of the school class. However, for finer measurement especially in cleavage situations allowances for group differences in size and composition should be made by comparison of results with those which would occur by chance.

For such comparisons the number of reciprocations which a group might be expected to make by chance must be calculated. The formulas which will be given are stated in terms of numbers of reciprocated and unreciprocated choices when it is more convenient to do so. However, reciprocation of choice is essentially a matter of pair formation, since under this experimental condition a selection never exists alone but assumes the existence of another selection which complements it. Obviously a reciprocated choice implies the existence of another choice responding to it, but nonreciprocal choices also occur in two's because the non-occurrence of a reciprocal pair

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<sup>2</sup>This is considered essential by Moreno for analyzing the social atom (see reference 7) and was found by Jennings to reveal patterning as Moreno predicted (see reference 6).



automatically produces two unreciprocated choices. This fact that the distribution is actually in two's does not affect the chance ratios to be stated. They are therefore given in terms of choices for the sake of simplicity. But the use of pairs becomes important in the tests of significance which will be discussed.

The first formula for predicting the number of reciprocated choices which a group might be expected to make by chance, was developed by Lazarsfeld for distributions presented by Moreno and Jennings (8). It is intended for cases in which each individual makes a designated number of choices under a single criterion, e.g., each member makes three choices of a person beside whom he would like to sit in school class. The formula can be stated as (1):

$$R = N(N - 1)p^2$$

in which  $R$  = the expected number of reciprocated choices,

$N$  = the number of individuals in the group,

$p$  = the probability that a given individual will be chosen by another individual.

If each individual makes  $d$  choices,  $p = \frac{d}{N - 1}$  and  $q = 1 - p$ .

The corresponding formula for  $U$ , the expected number of unreciprocated choices, is (2):

$$U = N(N - 1)pq$$

$R$  plus  $U$  of course equals  $T$ , the total number of choices.

The next step is to extend this formula to experiments in which the subjects choose under more than one criterion, the number of specified choices remaining constant from subject to subject and from criterion to criterion. Each subject may be asked to make two choices of a person to study with, two choices of a luncheon companion, finally two of a baseball teammate.

One method of dealing with results from a variety of criteria has been to list for each subject all his choices made under all criteria, omitting duplication, and to then treat them as if they had been made under a single criterion. The variety of criteria is thus made to function merely as a device for increasing the number of choices and loses the full picture of pair relationships. With a multicriterial setup, however, two treatments using all the choices are possible.

Under the simpler treatment formulas (1) and (2) are used for each criterion separately and the expected amount of reciprocated choice is then

the simple sum of the numbers expected under the single criteria. The chance number of reciprocated choices, taking  $c$  as the number of criteria used, would then be (3):

$$R_c = cN(N - 1)p^2$$

Formula (2) would also be multiplied by  $c$  to obtain  $U_c$ .  $T$  would equal  $Ncd$ .

The second and more complicated treatment makes a maximum use of the amount of reciprocation present by employing what might be designated as interstitial or cross-criterial relationships between persons choosing under different criteria. In this case the experimenter takes advantage of the fact that, although A's choice of B may be unreciprocated under criterion 1, B may have chosen A under criterion 2 or 3. Such reciprocation, although not as strong or direct as within-criterion reciprocation, is a type of mutual relationship and may have merit in any measure which attempts to cover every shade of reciprocation present.

A formula for predicting reciprocatal relationships including interstitial ones has been offered by Bronfenbrenner (1), but it is less rather than more sensitive than the usual reciprocation formulas, since it predicts only the number of relationships in which the two participants form one or more reciprocal pairs of either a within-criterion or cross-criterion type. Thus no exact number of choices is predicted. A more precise formula was devised and previously discussed briefly by the writer (5).

In making cross-criterial analyses it is important to remember that all choice relationships are equally eligible for inclusion. There is a temptation to ignore all interstitial mutuals except those between persons otherwise not choosing each other, since in using interstitials the experimenter hopes to salvage subterranean connections between individuals appearing not to be mutually related.<sup>3</sup> Nevertheless it is logically necessary to count all interstitial pairs including those occurring between individuals already choosing each other under a single criterion.

This means that A's choices under criterion 1 are also considered in their relationship to all choices made by the rest of his group under criterion 2, under 3, etc. A in his character under criterion 1 is transplanted temporarily to the group as organized under criterion 2 and his reciprocations counted; then he is similarly transplanted to the group as struc-

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<sup>3</sup>For differentiating factors tending to draw certain individuals together in some groupings and apart in other groupings, see J. L. Moreno (reference 7) and H. H. Jennings, *Sociometry of Leadership*, Sociometry Monograph No. 14, 1947, or *SOCIOMETRY* Vol. X, No. 1, 1947.

tured under criterion 3. In his character as chooser under 2 he is also placed in the group structure under 1 and under 3; and so on. The result is that for  $c$  criteria each of a subject's choices must be counted  $c$  times. Thus if he makes  $d$  choices per criterion, his total number of choices under one criterion increases to  $dc$  and the total for all his choices is  $dc$  multiplied by  $c$ , or  $dc^2$ . The total,  $T$ , for all subjects would then be  $Ndc^2$ . If  $d$  is constant for all subjects and all criteria,  $p$  is the same for whatever criterion the subject's choices are considered under. We therefore have for the expected number of choices the same  $p$ ,  $q$ , and  $N$  for  $c^2$  instead of  $c$  criteria. The formula for the expected number of reciprocated choices then becomes (4):

$$R_{cc} = c^2 N(N-1)p^2$$

The expression for  $U_{cc}$  is similarly formula (2) multiplied by  $c^2$ .

In certain investigations the experimenter considers it desirable to permit the subjects to make as many choices as they wish and therefore specifies no special number. In other investigations a number of individuals may make  $d$  variable by refusing to give the specified number of choices. In such cases the  $p$  and  $q$  values must be obtained by the use of averages.

If individuals make different numbers of choices,  $d_1, d_2, \dots, d_n$ , then each person has a different probability,  $\frac{d_1}{N-1}$ , of choosing any other individual. The chance of a pair between A and B would then be  $p_1 p_2 = \frac{d_1}{N-1} \frac{d_2}{N-1}$ . The value of  $p^2$  for the group under one criterion would be the average of these individual probabilities for all possible combinations of  $N$  individuals taken two at a time, that is,  $\frac{N(N-1)}{2}$ .

This result can easily be arrived at by obtaining the average value of  $d$  and using it as usual in the formula for  $p$ . Thus 10 subjects making an average of 2.7 choices apiece under criterion 1 would yield a  $p^2$  of .09 and make 8.1 reciprocated choices by chance under that criterion.

With variable  $d$ ,  $p$  and  $q$  of course vary from criterion to criterion and the formulas for  $T$ ,  $R$ , and  $U$ , must be modified accordingly. For cases in which  $c$  criteria are used,  $d$  is the average number of choices per criterion, and cross-criterial relationships are not considered,  $T$  equals  $N(d_1 + d_2 + \dots + d_c)$ , and the expected number of reciprocated choices is (5):

$$R_c = N(N-1) (p_1^2 + p_2^2 + \dots + p_c^2)$$

With cross-criterial mutuals used,  $T$  equals  $Nc(d_1 + d_2 + \dots + d_c)$ , and the expected number of reciprocated choices becomes (6):

$$R_{cc} = N(N-1) [(p_1^2 + p_1 p_2 + \dots + p_1 p_c) + \dots + (p_c p_1 + p_c p_2 + \dots + p_c^2)]$$

Corresponding  $U$  formulas are (7) and (8):

$$U_c = N(N-1)(p_1 q_1 + p_2 q_2 + \dots + p_c q_c)$$

$$U_{cc} = N(N-1) [(p_1 q_1 + p_1 q_2 + \dots + p_1 q_c) + \dots + (p_c q_1 + p_c q_2 + \dots + p_c q_c)]$$

After chance formulas have been devised the problem arises of expressing the amount of group integration present by relating the experimentally obtained distribution of reciprocated-unreciprocated choices to the chance distribution. A feasible method of accomplishing this is to divide the obtained ratio of reciprocated to unreciprocated choice by the chance ratio calculated from the revelant equations. In all cases  $N(N-1)$  and  $c$  will cancel out in the chance ratio. Where  $d$  is constant throughout, the chance ratio simply reduces to  $\frac{p}{q}$ , regardless of number of criteria or use of interstitial choice. All of the formulas apply to the experimental data whether  $T$  is odd or even.

If  $R_o$  is the obtained number of reciprocated choices and  $U_o$  is the number of unreciprocated, the index of group coherence or integration,  $I$ , can for constant  $d$  be expressed as (9):

$$I = \frac{R_o q}{U_o p}$$

The other more complicated expressions of  $I$  can be obtained by use of formulas (5) through (8). If average  $d$  values for different criteria are closely similar, a simpler procedure would be to use one average  $d$  based on all choices under all criteria, obtain the  $p$  and  $q$  values from it and use formula (9).

In the determination of obtained  $R$  with inclusion of interstitial relationships care must be taken to count all cross-criterial reciprocations including those between persons who also chose each other within criteria. When obtained  $R$  has been counted  $U$  can be arrived at easily by subtraction of  $R_o$  from  $T$ .

For illustrative purposes suppose that 10 children make unlimited choices under two criteria. For criterion 1, the average number of choices made is 2.7; for criterion 2, average  $d$  is 3.6. Then,  $p_1 = 2.7/9 = .3$ ,  $q = .7$ ,  $p_2 = 3.6/9 = .4$ ,  $q_2 = .6$ ,  $T = Nc(d_1 + d_2) = 126$ . The numerator of the chance ratio is, from equation (6):  $.09 + .12 + .12 + .16 = .49$ . The denominator is, from equation (8):  $.21 + .18 + .18 + .24 = .81$ . The ob-

tained numbers of choices are: under criterion 1, 12 reciprocated and 15 unreciprocated; under criterion 2, 20 reciprocated and 16 unreciprocated; under crossed criteria, 40 reciprocated and 28 unreciprocated. Dividing the obtained ratio of 72/54 by the chance ratio of .49/.81 gives 2.20 as the integration index.

Besides determining the degree of integration, it is interesting to measure the amount of intergroup preference exhibited at a given level of integration. One might wish to find out whether a group of Italian and American girls forming 20 mutual pairs had done so without showing any nationality preference. For this determination the total number of possible pairs for the group of  $N$  members  $\frac{N(N-1)}{2}$ , is divided into the number of pairs which

would by chance be American-American, Italian-Italian, or Italian-American. The obtained number of pairs is then divided according to these chance proportions and compared with the distribution as derived from the experiment. The ratio is calculated between the number of pairs formed within nationality groups and the number formed between nationality groups. This is divided by the corresponding chance ratio to give an expression of nationality preference as expressed in reciprocation.

In the above procedure the chance distribution of the obtained number of pairs is estimated by determining for each nationality group of  $n$  individuals the number of combinations of two which they can form,  $\frac{n(n-1)}{2}$ , and determining for each possible combination of different nationality groups the number of pairs they can form,  $n_1 n_2$ . The total of all these pairs is  $\frac{N(N-1)}{2}$ .

Reciprocation ratios should be a useful supplement to other measures of cleavage based on unreciprocated choice or choice volume in general. A variety of types of indices could no doubt be developed.

A further problem in this type of measurement is the test for significance of the deviation of the structural index from chance. For this purpose Bronfenbrenner has suggested using tables of the binomial distribution (1). He takes the expected number of reciprocated choices as the mean of a binomial series, expresses the obtained number of reciprocations as a deviation from this mean, and determines from suitable tables how many times the given deviation would be obtained by chance. Although this method applies well to individual choices which are binomially distributed, it is inapplicable to patterns of choice, as the writer has pointed out (4).



In pattern measurement our concern is with the number of patterns of a specified type which a group will produce if arranged by chance alone. The expected value will be the mean number of patterns produced in all possible arrangements of the group by chance. In these arrangements of the total membership the basic element is not the individual, A, or his choice, B, but the individual-making-a-choice, A:B. In a group of three persons making one choice each the elements are then A:B, A:C, B:A, B:C, C:A, C:B. Not all can enter into any one chance arrangement. This suggests the complexity of the chance distribution, since all the elements are involved in prediction.

Whereas the binomial expansion yields the distribution of  $n$  unitary independent events, the reciprocal pair or any other pattern is a compound event formable in various ways according to how other events of the same type are made up and therefore hardly independent of them.

A method which seems suitable for any of the experimental findings discussed is to determine the deviation of the obtained from the expected distribution and apply the chi-square test, remembering that pairs, not single choices, are being dealt with. Thus for  $T = 80$ ,  $R = 24$ ,  $U = 56$ ,  $R_o = 40$ ,  $U_o = 40$ , the test would take the form:

$$X^2 = \frac{(20-12)^2}{12} + \frac{(20-28)^2}{28} = 8.62$$

If a fair number of group indices are available, mean differences between two types of group, e.g., boys and girls, could be evaluated in the usual manner by use of the standard error of the difference between means of indices. Probably in most cases only small numbers of groups would have been used and Student's  $t$ -test would have to be applied. Examples of the use of chi square and the  $t$ -test on sociometric data can be found in reference. (2).

Although the formulas and methods which have been discussed may appear complicated at first sight they reduce to relatively easily handled numbers. The greatest labor is not in the prediction of chance values but in the counting of reciprocated choices and this work can be greatly reduced if a tabulating machine installation is available. Methods such as those which have been proposed are worth using, since they produce a characteristic sociometric measure and may help to salvage structural material which is at present likely to be discarded.



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## PROGRESS AND PITFALLS IN SOCIOMETRIC THEORY

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### SOCIOMETRIC METHODS AND THE SURFACE-DEPTH CLEAVAGE WITHIN GROUP STRUCTURE

Sociometric tests show in a dramatic and precise fashion that every group has beneath its superficial, tangible, visible, readable structure an underlying, intangible, invisible, unofficial structure, but one which is more alive, real and dynamic than the other. This was found to be true of groups which have a highly formalized institutional character as well as of groups whose structure is informal, fluid and transitory. It was found that in a work or business relationship individuals do not respond in an objective and adequate manner; an individual, for instance, who had the opportunity to choose freely among two physicians who were considered of equal skill and requiring equal monetary expenditure, chose the one whom he liked best for some "personal reason". The skill angle, the economic angle and the private preference angle were subtly interwoven, resulting in one particular, specific choice. Another individual who had an opportunity to choose partners for a recreational situation, going fishing, had to put up with a carpenter across the street instead of a musician whom he would have preferred. In conclusion we can say that formal *and* informal groupings, whatever the criterion, do not differ sociometrically; they have in common the division between an upper and an under structure of personal relations.

The "personal reason" referred to in the above paragraph is nothing mysterious. It is a *displacement* of social feeling projected into an inappropriate situation. It is imaginable that in an utopian sociometric society the tele sense of individuals will be so highly differentiated and trained that when an individual chooses an associate for working together he would be influenced *only* by the objective requirements for the work situation and not by some cultural or amatory aspirations he may have, because they will be taken care of in the other groupings in which he participates. In such a society every criterion of grouping would be equally permissible and no individual will have to look for the realization of his social feelings in situations undesigned for their expression.

One of the difficulties which we have encountered in sociometric work is the definition and analysis of social criteria. Social criteria are the foci around which individuals cluster and around which groupings of varying de-

degrees of constancy and duration are formed. The more specific the criteria are the more care has to be taken to construct a sociometric test accordingly and the better are the chances that it will tap the most spontaneously intimate and real structures which individuals produce among themselves. There are studies which are not based on *any* criterion—"Whom do you like or dislike." They should not be called sociometric. There are studies which use vaguely defined criteria—"Who are your best friends, and who are your enemies." It is obvious that the more vaguely the criteria are defined, the less precise will be the sociometric test instrument and the less complete and more distorted will be the findings. Loosely defined criteria indicate that the aim of the sociometric investigator is not clear. A sociometric test does not merely require a subject to give a verbal response to a verbal quest. It tries to mobilize the subject, to arouse in him an action response, an action response however which he may have denied himself but which is the deepest, present expression of his spontaneity. Every sociometric test attempts to warm up the subject to act in behalf and in accord with his subjective reality level. It encourages him to act out, to be himself; it permits him to have a goal, a goal for himself, a goal of his own. If we ask a person therefore, whom do you like or dislike, he may relate to us at best some of his social perceptions but the process of self mobilization and realization is left out of the subject's world. But when we ask him in all earnestness to choose the one he wants to share a room with he is confronted with a situation, he has to make a decision, to think through the relationship, knowing that it may be consummated. In order that a test should help him in furthering the autonomy of his social relations the test has to apply to him, not he to the test.

A frequent pitfall has become the notion that by watching the activities of informal groups, as playing cards, going fishing, hitch hiking, picnicking, the intimate private structure of a group comes to the surface and that sociometric test procedures are thus superfluous. This trend of thought has been particularly encouraged by the Hawthorne experiment<sup>1</sup> (and by other studies of cliques, gangs, etc.). This experiment, however noble and worthy in itself tries in vain to use interview and observational techniques to supplant the sociometric test. I have warned against this pitfall in the early days of sociometry for methodical as well as for practical reasons. In any effort to disclose the interpersonal structure of a group, interview and observational

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<sup>1</sup>Roethlisberger and Dickson, "Management and the Worker", Harvard University Press, 1939.

techniques without the sociometric test are hopeless and incomplete gestures. After the sociometric test is applied however, a focus of inquiry and a focus for action is established which intensifies the value of interview and observation many times. From the point of view of systematic sociometric research the Hawthorne experiment belongs into a class of studies using pseudo sociometric clues and a pseudo sociometric language without applying sociometric instruments and a *thinking through* the findings—and without *carrying them out* to benefit the workers. It is the animal technique of the “maze” applied to a human situation. The workers are treated like guinea pigs instead of like autonomous, mature human adults. As the main results of the Hawthorne experiment were published at a time when a well established sociometric climate existed, the laborious work must be considered a regression.<sup>2</sup>

A period in the development of sociometry comes to an end which may well be called “halfway sociometry”. The halfway sociometrists of the last decade, especially some of the workers coming from general and abstract sociological schools, preferred broad and vast sounding questionnaires of interpersonal relations with a flair for sociometric concepts to the sociometric test itself. These questionnaires fell more easily into practicable academic methods of research but they diluted and deflated the sociometric method. The true sociometric test as we planned it is a revolutionary category of investigation. It upsets the group from within. It produces a social revolution on a microscopic scale. If it does not produce an upheaval in some degree it may arouse suspicion that the investigator has modified it so—in respect for an existing social order—that it becomes a harmless, poverty stricken instrument.

#### PSYCHO-SOCIO DRAMATIC METHODS AND THE PSYCHO-SOCIO CLEAVAGE WITHIN GROUP STRUCTURE

Psychodramatic and sociodramatic methods disclose that each individual or group of individuals belong simultaneously to a privately structured and

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<sup>2</sup>It is unfortunate that Dr. Roethlisberger and Dr. Dickson did not apply sociometric methods in their study; this is particularly deplorable because Dr. Elton Mayo, the senior exponent of the study, was appreciative of our sociometric experiments as early as 1931 and had read some of the material published (see letter from Elton Mayo in “Application of the Group Method to Classification” by J. L. Moreno, in collaboration with E. Stagg Whitin published by the National Committee on Prisons and Prison Labor, p. 82, 1931 and 1932, current edition “Group Method and Group Psychotherapy”). Indeed, *no* study of group structure can be taken seriously if it does not use sociometric methods wholeheartedly; they certainly can be improved but they cannot be bypassed.

a socially structured world. In fact, the hypothesis that a cleavage exists between private and social within every individual and in every group has been the reason why two different instruments, the psychodrama and the sociodrama have been constructed. The differentiation between psychological and social structuring takes place in every group, in home as well as in work groups, in school as well as in recreation groups, in formal as well as in informal groups. The impact of our social and cultural order is so all inclusive and penetrating that there is no grouping of any sort which is not permeated by some degree of collectivity. In turn there is no grouping able to exist without being permeated by some degree of spontaneous subjectivity because of the individual resistance to a given social order.

Helen Jennings,<sup>3</sup> in an interesting report concerning the difference in sociometric structure between psyche and socio makes the following statements: "... a population tends to form two distinguishable kinds of groups: (I) sociogroups, *i.e.*, groups where sociometric structure is based on a criterion which is *collective* in nature; . . . (II) psychegroups, *i.e.*, groups where sociometric structure is based on strictly *private* criterion which is totally *personal* in nature;" . . . "An analysis of the sociometric data based on the 'unrestricting' criterion, leisure-time (and/or) recreation), in the same community . . . reveals that the sociometric structure of groups formed around this criterion differs from the sociometric structure of groups formed around 'restricting' criteria (working, and/or living, in same group) to such extent and in such manner as to suggest we are dealing with 'groups' which are fundamentally different."

Helen Jennings, in making a very valuable point as strong as possible arrives here at a formulation which may create in readers not well acquainted with sociometric work a misunderstanding as to the meaning of our terms. We have reserved the term "group" for the total picture of the interaction of all factors operating on the psycho-social level, similar to the term organism which is reserved for the total picture of all factors operating on the biological level. To divide, therefore, a population into two categories, socio- and psychegroup, adds a new unnecessary hypothesis. It suggests the idea that there are two fundamentally different categories of groups whereas we agreed up to now that groups of every type are endlessly and continuously formed around specific criteria and as being filled with some psychic and some social structures. We can differentiate, as useful abstractions, between psycho and socio structures within a group, in situ, on the

<sup>3</sup>Helen H. Jennings, "Sociometry of Leadership", Sociometry Monograph, No. 14, Beacon House, 1947.



reality level as we are differentiating between psychodrama and sociodrama on the instrumental level. But just as we do not claim that we have a psycho and sociodrama per se, we cannot claim that there is a psyche and socio group per se. We do not want to convey the false impression that the psyche does not operate in home groups (or in a negligible way) and that the socio does not operate in recreational groups (or in a negligible way). The possibility of miscomprehension is eliminated if we hypothecate a split between psycho and socio within the sociometric structure of a group, the psycho trend showing greater intensity in certain groups, the socio trend showing greater intensity in certain other groups.

There is no sociometric evidence for the hypothesis that there are groups which are strictly collective, dominated by a collective pattern of behavior and groups which are strictly private, dominated by a private pattern of behavior. But there is increasing evidence of a *psycho-socio continuum*. The notion of two worlds, a private and a social, is based on views rarely challenged: a) That there is a psyche which is a private product reigning in splendid isolation, and that there is a socius, the product of social forces; b) that our social and cultural order is a devilish imposition upon our private psyches and if we could deliver ourselves from this order we would have our private psyches back undiluted, unhampered, in their original state of free spontaneity.



## A STUDY OF INFLUENCE IN SOUTHTOWN: II

FRANK A. STEWART

*Time Magazine, New York*

In an earlier report it was shown that Southtown's more influential and important people, as selected by their fellow citizens, tend to be somewhat older and to be better incomeed, better positioned, and better educated.<sup>1</sup> From this it follows that interpersonal influence by and large percolates down the socio-economic scale.

But if there is any one thing we learned in Southtown it is that our generalizations cannot be sharp. Being better incomeed, positioned, and educated is no guarantee of influentiality. And we have already reported the findings that five short-cut methods of personal identification—

- a. Holding of offices in civic and social organizations.
- b. Frequency of newspaper mentions.
- c. Self-evaluation on leadership items from a personality inventory.
- d. Self-evaluation as advisers.
- e. Magazine reading interests.

failed to delineate adequately the city's actual leadership and influence structure. Indeed, influentiality is nothing if not a highly individualized characteristic. While its incidence is a little greater in certain socio-economic classes, the fact is that *finding centers of influence is a matter of identification of individuals, not of classes.*

And to combat a little further the idea that quick, easy generalization may be made, please note what happened in Southtown to three of the principal occupational groups conventionally thought of as "opinion moulders."

*Newspaper Editors.*—Southtown has one newspaper editor. He received one vote only out of the 3,401 cast by 163 Southtowners on the 14 sociometric questions asked.

*Educators*—Southtown University's faculty—professors, associate professors, assistant professors, instructors, and lecturers—totaled 96 at the time of the survey. The university makes up an important part of the com-

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<sup>1</sup>Frank A Stewart, "A Study of Influence in Southtown," *SOCIOMETRY*, 1947, Vol. X, No. 1, pp. 11-31. The complete plan of study was outlined in this paper, including the 14 sociometric questions asked of the 163 adults interviewed, an approximate 25% sample of the white, permanent resident families in Southtown.

munity, and many of the faculty members have entered actively into community life. But these 96 faculty members proved to be identical in influentiality with the cross-section of Southtown citizens interviewed. (As seen by inspection and by Chi-square test with a P of .35.)

<i>Mentioned By:</i>	<i>Southtown University Faculty Members</i>	<i>Survey Respondents (Excl. Faculty Members)</i>
10 or more respondents	17%	17%
3-9 respondents	16	14
1-2 respondents	20	19
0 respondents	47	50

*Clergy*—All of Southtown's five clergymen received some mentions, but only one made a strong showing among the top influentials in the city. One of the questions asked—"When people you know have some personal trouble, to whom are they most likely to turn for advice?"—is clearly one which invites mentions of the clergy. Interestingly, all five of the people who mentioned Southtown's Catholic priest named him on this question; the votes on this question for the other four clergymen were five, two, two, and none. So the clergy made a very modest showing on a question biased in their direction. And excepting one minister who received a substantial vote as an "important" person (often qualified by the respondent saying something like "Well, he's got the big, fashionable church here, so he must be important"), their showings on other questions was most meager.

#### ADDITIONAL CHARACTERISTICS OF SOUTHTOWN'S LEADERS

Even if we cannot rely on any of the above methods as a short cut to identification of the individuals who are influential in Southtown, each makes some contribution to the characterization of those individuals. And further exploration of their characteristics is the purpose of this section—so as to give additional definition of the kind of people who are named by Southtowners as those they look to for advice, consult with, admire, consider important, etc.

*Length of Residence*—Increasing length of residence in Southtown is accompanied by an increase in the average number of mentions received by the person.

<i>Length of Residence</i>	<i>Average Number of Mentions Received</i>
Less than 5 years	2.2
5-9½ years	8.7
10-19½ years	9.0
20 years and over	17.9

Of course it is true that a person must live in a town for a while before he is considered a part of it or can have much interpersonal impact upon it. But in Southtown the fact that a person was of the "old original aristocracy" or of one of the "old families" was mentioned frequently as a reason for that person's importance. One respondent stated flatly that being an "...old resident . . . makes a big difference in this town."

As part of this same pattern, recent arrivals who had achieved positions of importance in the community were thought of as outlanders, "not a Southtown man." It was not uncommon for older respondents to recall that a person they were mentioning had moved to Southtown 20, 30, or even 40 years ago.

This clannishness results in such comments from comparative newcomers as "It's not a friendly town"—"It's hard to get acquainted here"—"I've been in only four homes during the whole six years I've lived here"—"I've lived here ten years and I'm still not a citizen"—"Everyone is so distant here; you just can't get to know them." An extreme statement along this line—"You have to live here 25 years or you're a foreigner"—came from the owner-manager of the town's variety store, a man who has been quite successful in business, is personable, and has made considerable effort to be of civic and community service. His statement presumably reflects disappointment at what he must think is his slow rate of acceptance by townspeople. (He was mentioned by five respondents, only one of whom was originally a Southtownner. But he would be reassured if he knew that the five consider him quite promising, and that Southtown's second most important citizen described him as follows: "He came here just a few years ago, built up a big business from nothing, captured good will, and is now recognized as a progressive leader in the community.")

*Satisfaction with Southtown*—As might be expected, increasing length of residence is accompanied by a rise in average scores on satisfaction with Southtown as a place in which to live.

<i>Length of Residence</i>	<i>Average Satisfaction Score*</i>
Less than 5 years	2.53
5-9½ years	2.81
10-19½ years	3.25
20 years and over	3.33

\*Based on answers to the questions, "Have you ever thought of going to live someplace else?" and (if "Yes") "What made you stay?" or (if "No") "Why not?" The answers were classified into: (1) Anxious to get away; (2) More interested in going away than staying; (3) More interested in staying than going away; (4) Wants very much to stay. Scoring was from 1 to 4 in the same sequence. Therefore a low numerical score indicates dissatisfaction, and a high numerical score indicates satisfaction with living in Southtown.

In turn, a high correlation exists between satisfaction with Southtown as a place in which to live and the number of mentions received.

<i>Satisfaction-Dissatisfaction</i>	<i>Average Number of Mentions Received</i>
Anxious to get away	1.7
More interested in going than in staying	5.5
More interested in staying than in going away	10.7
Wants very much to stay	15.3

Age, length of residence, and satisfaction with Southtown as a place in which to live all necessarily correlate positively with each other. There are reasons why each of the three helps to characterize many of Southtown's influential and important people. But age and length of residence are bland while satisfaction is a vital characteristic. It is a personality dynamic that mirrors a person's ability to adjust to his community environment and to participate in its affairs and progress. It does not have to mean stand-pat-tism, but it does have to mean liking that community and being willing to belong to it. And as will be seen in more detail later, it means being willing to work, to serve community needs and interests, if one is to be recognized as a leader in the community.

*Emotional Expansiveness*—Respondents who gave the largest number of mentions on the 14 questions asking for names also tended to receive the largest number of mentions from other respondents.

<i>Ranking of Respondents by Number of Mentions Received</i>	<i>Average Number of Mentions Given</i>
First third	25.9
Second third	20.8
Lowest third	16.2

The correlation (.48) is modest but positive, and the more impressive in view of the extreme skewness of the distribution of mentions received—with one person receiving 255 mentions and another 184, while at the lower end of the scale 76 respondents received no mentions whatever.<sup>2</sup>

This finding is in accord with well developed evidence that one's emotional and social expansiveness contributes importantly to his sociometric status.<sup>3</sup>

<sup>2</sup>The correlation coefficient was computed on rank differences, from which the product-moment coefficient of .48 was inferred.

<sup>3</sup>Note particularly J. L. Moreno, *Who Shall Survive?*, (New York: Beacon House, 1934), pp. 134-141, and the clearcut differentiation between emotional and social expansiveness in Helen Hall Jennings, *Leadership and Isolation*, (New York: Longmans, Green, 1943), pp. 42-43 and 62-65, 89.

This measurement is partially dependent upon but related only in minor part to "acquaintance volume," a much grosser measurement. Breadth of acquaintance is sometimes urged as a point of measurement, on the thinking (crudely simplified here) that: the more people you know the more who know you and, everything else being equal, the more people who know you the more important a person you are in the community. Breadth of acquaintance was not measured in this study—as it is neither practical in an interview situation nor sufficiently selective to have any real value in identifying leadership elements. It is involved in the matter of mentions given and received, of course, but these have little meaning except with qualifying frames of reference. (*E.g.*, one might run an acquaintance or a name-recognition poll in a community and, substituting nationally known names, find Leo Durocher, Albert Einstein, Fiorello LaGuardia, and Tommy Manville sharing honors as best acquainted or as most recognized names.)

*Sex Considerations*—The fact that Southtown's men outpaced the women in number of mentions received has already been reported.<sup>4</sup> This was especially marked on Question 12, "Who would you say are the important people in town?" However, Question 13—"Which would you consider the most important women in town?"—called specifically for women's names. While this restored balance in part, combined results from the two questions indicate women tend to be considered less important in Southtown than the men.

	% of Combined Question 12 & 13 Mentions for:	
	Men	Women
108 Women Respondents	51.2%	48.8%
55 Men Respondents	63.6	36.4

This matter was not a part of our formal investigation, but several men volunteered comments such as: "Town not run by women-folks. Hen parties are not important"—"Women here don't do much"—"You've got me now. I can't think of any that stand out"—"Hard to answer. I hadn't thought about things that way" (this last from one of the really top men in the city). One woman, a well-acquainted, shrewd person, came out flatly with, "None, I don't think there are any." Another suggested that Southtown women are important only as wives of important men since, "Most wives have the traditional Southern background of families, homes and few civic activities." And a third woman complained, "There's not much for a woman to be important in around here except in a social way."

<sup>4</sup>Stewart, *SOCIOMETRY*, *op. cit.* p. 17.



Our impression—from studying the local newspaper and the city's organizational framework, but mostly from many other comments picked up in this cross-sectional interviewing—is somewhat different. A male respondent overstates the case in saying, "Peculiar town as regards women; practically every woman is a worker." But many of Southtown's women are performing capably in various civic, welfare, and cultural enterprises, and a few appear to have done as well as the men in such wartime activities as bond drives and scrap collection. One woman suggested, "Position has a lot to do with it (importance) in American life. Too much!" Whatever the reason, it appears that Southtown's women do not so much lack importance to their community as they lack recognition of their importance—and even this is relative, since a few wives ran far ahead of their husbands in mentions received.

*Personality Factors*—The group approach employed thus far can be followed further to find some of the personality characteristics common to many of the people Southtowners consider important. Our study did not include psychometric and psychological testing, but the "Why do you think so" type of sub-questions asked in conjunction with each question which called for the naming of names did reveal quite a lot about the person named. For example—

Mr. A, about 55 years old, an attorney with a reputation and a practice extending well beyond Southtown, has developed into the city's "first" citizen. His father was a professor at Southtown University. A was graduated from there and set up law practice in town. He early threw himself into local affairs, and has been Mayor for half his adult life.

He much prefers a small community as a place in which to live. And Southtown has served him well, for he is a big man there who is beloved or respected by just about everybody. A number of people stated he would be Mayor as long as he wants to be, and some felt that he is Senatorial timber. There was no evidence of feeling that he "runs the town" (in a derogatory sense). Yet he is looked to as a leader and adviser.

He was selected by 88 Southtowners as one of the city's most important people. (His five nearest competitors received 66, 63, 41, 38, and 29 votes, respectively.) Of these, 59 gave recordable answers to the sub-questions—

"In what ways is Mr. A important?"

"Now that you stop to think about it, how do you suppose Mr. A came to be important?"



These are quoted verbatim, the bad with the good, as follows:

*From 29 men*

Personal qualities of industry, good judgment, background and training.

Everyone respects and admires him—because of his being a real civic and community servant.

Good lawyer and Mayor. A man who is depended upon in crises and emergencies.

He is intelligent and has character. Many people go to him because they respect him and have confidence in him.

Takes active interest in local affairs. Has good judgment. Combination of integrity, industry, and intelligence.

People are convinced of his sound judgment.

Has been very careful in watching community funds and filling needs. I have confidence in him.

Takes an active part in all things that pertain to Southtown. Is on every committee and every program.

Well-informed and capable man. Lived here all his life. One of our good citizens and has been useful in town.

A natural leader. Came from good family noted for its honesty and brilliance.

People do not rate him as a big man. He's modest personally but his abilities are limited. Has much social prestige.

Always has time to see people.

Leading lawyer, old time resident, brother of Admiral.

He's a respected person in his profession. Generally civic-minded. These, plus other things, cause him to have the confidence of a large number of people.

Well versed in all subjects. Desire and hard work. A great combination to be of service. He's one of our best respected men and his judgment is relied on, yet he speaks to the little man as well as the others.

Good man, good lawyer. Born and raised here.

One of leading attorneys in the state. Very public spirited.

Merely on account of his position.

Mayor. Lived here all his life.

Takes a big interest and will help in most everything.

He's Mayor of the city, and a very swell fellow. In his dealings he's been on the up and up with the public.

More brains than anyone else.

Mayor—ability.

He takes active interest in all community affairs. Grew through his ability to help other people and through his work in civic affairs.

Highly respected—certainly in a position to be important.

Mayor and very active in public affairs.

He probably handles 60% of the law cases in town, and is the

confidential adviser of a large percentage of the people, as well as being Mayor.

Much of his influence due to his position.

Mayor and prominent attorney. Well connected, very fine gentleman, brother of Admiral.

*From 30 women*

Naturally smart.

Has town so at heart. Very interested in what's good for the town. Grew up here.

Very civic minded. Interested in church and college affairs. Has had a long period of influence, always lived here, father was greatly respected and loved.

Fine public spirited man. Capable, kind, fine family and background. A big man.

Just Mayor and old-time citizen.

Life-time resident, son of well known college professor, a family of Phi Beta Kappas. Knows entire town, excellent lawyer, character unimpeachable.

Very capable, good background (father a famous professor), personality, well-liked, able.

By birth—father a professor and brother an Admiral.

His character and integrity. When he became prominent the town was small and a lawyer would stand out. Family background had a lot to do with it.

He's a lawyer and is important politically. Been citizen all his life, good lawyer, active in civic and religious affairs, well liked.

Has the kind of character that would make him important, even if he wasn't the Mayor.

Interested in all things that go on around town. Very friendly with people—gets around to see them.

Born and raised here. (Father a professor) Has a great deal of ability and personality.

People here rely on his opinion. Born that way—good background.

Men go to him for advice. Good personality, a real nice guy.

Civic minded person.

As mayor is into everything.

Participates in most things of local interest.

Takes active part in all kinds of drives.

Everyone takes their troubles to him.

He stays at his job.

Born and raised here. Takes interest in the town.

Very smart and honest lawyer.

Way he has conducted civic affairs in wartime crisis.

Very substantial and fine, has great prestige.

Old resident. People go to him for advice. It's amazing what problems people take to him.

Very well-educated. Takes interest in the town.

As citizen who grew up here, he loves the South and what Southtown stands for.

Southtown boy who is outstanding.

Born and raised here. Has interest of the community at heart. Well-educated, has wide law practice, and has the confidence of the people.

In brief, a man almost universally loved, trusted, respected, and recognized as an active force in the community. And with a personality inviting friendship, admiration, and confidence.

When Mr. A was interviewed, it seemed that the comments of the townspeople were well borne out, at least by his surface attitudes. He enjoyed the interview, was very cooperative, and answered thoughtfully and fully. His selections of people indicate (1) *a respect for knowledge and ability*, and (2) admiration for *and a feeling of kinship with those interested in and willing to work on social and other problems of the community*.

This man, the apogee of importance and influentiaity in Southtown, may thus be seen to have just about all the qualities discussed thus far—position, income, education, long residence, background, satisfaction with Southtown, etc. But one new element has been introduced in this material on Mr. A, an element which is probably more important than all the others—his sincere interest in civic affairs. It's a broad term, but Mr. A's interests and progressive contributions along this line appear to have been just as broad as the term—excepting, of course, the kind of activities carried on exclusively by the women's organizations.

And we also see something of his personality. His modesty and tact keep him from being spectacular but, coupled with his quiet assurance and his willingness to accept responsibility, they contribute much to his being an effective public servant. His conscientiousness and diligence are recognized and appreciated. His kindness, geniality, and approachability are real assets in his dealing with the people—large and small—of Southtown. All these contribute to the admiration with which he is regarded. And they help make it possible for him to be the success that he undoubtedly is, which in turn wins for him confidence and respect as a doer.

Other important people in Southtown have these qualities in varying degree. As personalities, some are driving, some commanding, some perhaps just friendly. But a very large share of the top leaders have some amount of dedication to community service in their makeup. For whatever reason, it's there, with both men and women serving in all kinds of civic capacities, and apparently doing it well, too. This at least is what the interviews

showed. For this quality of civic interest (and of real service to the community) appears again and again in respondents' comments about others who shape up as important in Southtown.

This study lacks any wholly objective method of analyzing personalities and of measuring the presence or absence of the quality of community service in a person's makeup. But the interview material is rich enough to permit rough classification on these points.<sup>5</sup> So the checkpoints, "Has Favoring Personality" and "Is Community Servant" have been added with some assurance to Table 1.

This table is presented as a summary of the more significant characteristics of the people Southtowners consider important. The material has appeared in group form in this and in our earlier report. But these people first are individuals, and Table 1 will serve to recall that fact both by focusing on the individual and by showing how the attitudinal and background makeup of these people varies.

#### EVERY SOUTHTOWNER AN INDIVIDUAL PROBLEM

The emphasis in the preceding section has been on the characteristics of the few whom Southtowners select as "important." This enlightens us about the kinds of people who are outstanding, but it has little bearing upon what personal lines of contact actually bind the community together, and tells nothing about the semi-independent islands of influence existing below the tightly-knit top levels nor of the blockages and breaks found in the lines of interpersonal influence as they work their meandering way down the socio-economic scale.

Viewed sociometrically, there are two main pillars of interpersonal attraction in Southtown, peaking up to the two leading citizens. Relations between these two men are in no wise embittered and they respect each other, but they are distinct if unannounced rivals. And their own choices, as well as those of several within their following, reflect a certain amount of cleavage between the two groups.

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<sup>5</sup>Principal reliance was placed on comments made by respondents on the "Why do you think so?" type of questions that were asked about each person named. This was supplemented in the cases of persons who were interviewed, by the self-revealing comments they may have made, plus whatever observations could be made at the time of the interview. It may well be that a favoring personality and an interest in community affairs must be possessed in some degree by all persons picked by several of their fellow citizens as "important." But as a cutting point only those whose qualities of this nature were strong enough to occasion comment by at least one respondent (usually several) are credited on these checkpoints in Table 1.

TABLE I.  
*Characteristics of "Important" People*

Individual		Votes Received as an "Important" Person	Has High Business or Professional Position	Is High Income	Is College Graduate	Magazine Reading Score (Top quartile)	Is an Office Holder (Two or more)	Long Local Residence (20 years or more)	Highly Satisfied with Southtown	Leadership Item Score (Top quartile)	Is Frequent Adviser	Is Emotionally Expansive (Top quartile)	Has Favoring Personality	Is Community Servant
Mr. A	Mayor and lawyer	88	✓	✓	✓		✓	✓	✓	✓	✓		✓	✓
Mr. B	Top business executive	66	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
Dr. C	College president	63	✓	✓	✓	?			?		?	?	✓	✓
Mr. D	Public Relations	41	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓
Mr. E	Lawyer and politician	38	✓	✓	✓		✓	✓		✓	✓	✓	✓	✓
Mrs. F	Department store owner	29	✓	✓			✓	✓		✓				✓
Rev. G	Leading minister	27	✓	✓	✓	✓	✓		✓	✓	✓	✓		✓
Dr. H	Leading dentist	27	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Mrs. E	Wife of E	24		✓			✓	✓		?	?	?		✓
Mr. I	Bank president	23	✓					✓		✓	✓	✓		✓
Mrs. B	Wife of B	23		✓	?	✓		✓	✓	?	✓	✓	✓	✓
Mrs. J	Wife of professor	23		✓	✓	✓			✓			✓		✓
Mrs. C	Wife of C	22		✓	?	?			?	?	?	?	✓	✓
Mrs. K	Wife of businessman	22		✓	?	✓		✓	✓	?	?	?		✓
Mrs. L	Wife of postmaster	21		✓		✓	✓	✓			✓	✓		✓
Dr. M	Leading physician	21	✓	✓	✓				✓					✓
Mr. N	Federal judge	17	✓	✓	✓	✓		✓	✓		✓			✓
Mrs. O	Exec. Secy. Red Cross	15				✓			✓		✓		✓	✓
Mrs. P	Wife of professor	14		✓	✓		✓		✓	✓	✓	✓	✓	✓
Miss Q	School teacher	14			✓	✓				✓	✓	✓	✓	✓
Miss R	Dean of women	13	✓	✓	✓	?			?	?	✓	?		✓
Mrs. I	Wife of I	12		✓	?			✓		?	?	?		✓
Mrs. G	Wife of G	12		✓	?	✓	✓		✓	?	?	?		✓
Mr. S	City treasurer	12	✓	✓				✓	✓				✓	✓
Mr. T	County attorney	12	✓	✓	✓			✓			✓	✓	✓	✓
Mrs. M	Wife of M	12		✓			✓		✓	?	?	?	✓	✓
Mrs. U	Wife of business exec.	10		✓	?		✓			?	?	?		✓
Mrs. V	Wife of engineer	10								✓	✓	✓		✓
Mrs. D	Wife of D	10		✓	?	✓			✓	?	?	?		✓
Miss W	College instructor	9	✓	✓	✓	✓		✓			✓	✓		✓
Mr. U	Bus. exec. (see Mrs. U.)	9	✓	✓	✓		✓				✓	✓	✓	✓
Rev. AA	Young minister	9			?	?	✓		?	?	?	?	✓	✓



TABLE I. (Cont'd)  
*Characteristics of "Important" People*

Individual		Votes Received as an "Important" Person	Has High Business or Professional Position	Is High Income	Is College Graduate	Magazine Reading Score (Top quartile)	Is an Office Holder (Two or more)	Long Local Residence (20 years or more)	Highly Satisfied with Southtown	Leadership Item Score (Top quartile)	Is Frequent Adviser	Is Emotionally Expansive (Top quartile)	Has Favoring Personality	Is Community Servant
Mr. BB	City manager	9			✓	✓	✓			✓				
Mrs. CC	Social worker	8			✓	✓				✓				✓
Mr. DD	Automobile dealer	8	✓	✓			✓	✓	?	✓	✓	✓	✓	✓
Mrs. EE	Wife of professor	7		✓	✓	✓			✓		✓	✓		✓
Dr. FF	Supt. state hospital	6	✓	✓	✓	?			?	?	?	?		
Dr. GG	Second physician	6	✓	✓	✓	?		✓	✓	?	?	?		
Mrs. HH	City clerk	6				?		✓	?	?	?	?		
Mr. II	Store manager	6	✓	✓	?	?	✓	?	?	?	?	?		
Mr. JJ	Drug store owner	6	✓	✓	?	?		✓	?	?	?	?	✓	
Mrs. KK	U.S.O. staff worker	6						✓		✓		✓	✓	
Prof. P	Professor (see Mrs. P.)	5	✓	✓	✓				✓	?	?	?	✓	
Miss LL	Retired librarian	5			✓	✓		✓		?	✓			✓
Miss MM	Retired	5			✓		✓	✓				✓		✓
Mr. NN	Lumber yard owner	5			?					?	?	?	✓	
Mr. K	Auto dlr. (see Mrs. K)	5	✓	✓	✓	✓		✓	✓	✓				

Note: Cases where it was impossible to determine the presence or absence of a quality are denoted by a question mark—?. These cases are found among persons who were not interviewed and for which inferences could not be obtained in interview material from others.

A rather distinct form of in-groupism is found in three of the city's social classes: (a) the old, original families, (b) the university people, and (c) the important group of executives employed by Southtown's principal industry. The choices made by persons in each of these groups are by no means confined to their own groups. But, while there is interweaving between the three, the central tendency in each is to make choices within that group.

Contrasting with these three groups are the non-belonging newcomers. They, with few exceptions, have made little progress toward acceptance by the community. Their choices appear to be fumbling and uncertain, with a few aimed at people from one or the other of the three dominant social

groups, but with other of their choices scattered widely and to appearances sometimes indiscriminatingly.

Another fairly important numerical group is that of employees of the state hospital located at Southtown. Those sampled indicated they were almost totally outside Southtown in any social sense. Their choices, perhaps because of their being cut off from Southtown, were narrow and ingrown.

Finally, the Southtowners interviewed represented all degrees of sociality. Some seemed to know just about everyone; others mentioned only their boss, their grocer or perhaps their next door neighbor.

Add personality factors to all the foregoing and it can be understood that sociometric charting of the 500 Southtowners mentioned by one or more respondents would reflect a near-infinite number of variables, many of which undoubtedly have been left undiscovered by this study. Perhaps it will serve to state that: (a) the precise status each person has in the community varies from that of every other person; (b) the strength of each person's linkage to others in the chains of interpersonal contact and flow of ideas and influence of which he is a part varies widely; and (c) the flow of ideas and influence, like a river, is neither straight line nor equally strong and compelling at all points along the channel.

If these things are so—and they have to be, subject to the usual qualifications about central tendencies—then the community organizer, the advertiser, or the public relations practitioner who is after maximum effectiveness must move just as far as his budget will allow toward personalization of appeal.

It is just at this point that the second and greater value of the sociometric survey becomes evident. For it reveals both the ideological basis and the personal vehicle for an individualization of appeals. That is, it will show what persons can be counted on to have interpersonal impact on any one individual; and an analysis of that individual's choices and of the qualifying answers he gives the interviewer will indicate what type of appeal will be most likely to succeed with him.

This is getting beyond the needs of the advertiser or the public relations practitioner—for they rarely can go all the way toward personalization of appeals. (They might, of course, use such an approach to advantage in directed mail efforts.) Their need, however, will generally be satisfied by learning who the important, influential people in a community, and ultimately the nation, *really are*; and then using media that best cover this primary influence market for goods or ideas.

But the community organizer is going to get his chief values from this

second phase—the detailed person-by-person analysis. Sociograms will help visualize the lines and centers of influence. And a highly schematic, non-detailed sociogram of the entire community will serve the extremely desirable purposes of reminding the organizer (a) that his goal is organization of the whole community and (b) that he has many fronts along which he must be pushing his attack.

Whatever descriptive tool is used, however, sociometric survey results have to be reduced to specifics, to words as a guide for action. The survey analyst should, in brief, be able to spot all key people in all classes and levels in the community, indicate something about the kinds of ideas they now hold, show what individuals they look to with respect, reveal what following each has, and thus chart the channels by which ideas flow through the community.

With this help, the community organizer should be able to go far toward building just as strongly as his movement is sound. The methods would be at hand; the onus then shifts to the movement to prove its earnestness in seeking total community participation.

#### SUMMARY

The characteristics of the important people of Southtown, as revealed by sociometric survey in early 1944, generally include high socio-economic status, a sense of belonging to the community, and a favoring personality of which an inclination toward service to the community is an important component.

But the people of Southtown, or of any other city, are individuals. The more insight gained into their personalities and motivations, therefore, the more they resist classification and generalization. So it is well, in any thinking about procedures looking to creation of a community movement which really affects and includes substantially everyone in the locale, for example, to consider just about every person an individual organizing problem.

The sociometric survey promises much, both as an aid to understanding the interpersonal structure of the community and in pointing to the key individual objectives and the appeals required by each. It can mean a stepping up in the effectiveness of community organizers, advertisers, or public relations practitioners virtually to the maximum permitted by the soundness of their programs.

## ORGANIZATION OF THE SOCIAL ATOM

By J. L. MORENO

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The number of acquaintances which an individual has at the time of testing has been called by me his "acquaintance volume". A person may remember about many of these individuals only that he has met them or talked with them. Most of them, however, do not matter to him, do not mean anything personal to him. And he doesn't matter to them; he doesn't mean anything to them, at least at the moment. But among these acquaintances there is a small group who mean something personal to him, in some degree and in respect to some criterion; he is attracted to them or he rejects them. There may be in this group, whether he knows it or not, individuals to whom he means something, who are attracted to him or who reject him. If we compare with the physiological cell this acquaintance volume, we may say that the general pattern of acquaintances which are without individual meaning for him is like the cytoplasm, and the meaningful acquaintances like the nucleus of the cell. Often the boundary between the outer mass and the nucleus of acquaintances may not be absolute. There may be some individual about whom it cannot be said with finality whether he is a mere acquaintance or already an emotional partner. But the general demarcation line between the nucleus of emotionally related individuals which I termed the "social atom" and the rest of the acquaintance volume will be very clear.

The point of transition from being a mere acquaintance to becoming an emotional partner in a social atom is theoretically significant. A study of numerous social atoms reveals a definite line of demarcation between the acquaintance volume and the social nucleus proper, the "social threshold". We can say that the moment that I wish a certain acquaintance—an individual whom I have just met or whom I may have known for some time—to become closer to me, to enter into a relationship with me, more or less permanent in respect to some criterion, work, love, or whatever, this person has passed the social threshold of my social atom. The same can be said about individuals who wish to enter into a relationship with me, whether I reciprocate their desire or not. They also have passed the threshold of my social atom. To my social atom evidently would belong all individuals to whom I am bound by an invisible desire which may be little or not at all manifest; also those individuals to whom I am tied in actual overt relationships. Indeed, we here see the social atom itself further subdivided into two parts: the outer part of the nucleus formed by the "wished" relationships and the inner part of the nucleus formed by the actualized ones.

The emotional currents which, so to speak, pervade a social atom are of varying intensity. There are many levels of preference. We made a study of the factors contributing to this uneven distribution of preferences, or better said, the uneven intensity of feeling preferences. For a certain social situation (choosing of house-members), the majority of the subjects made full use of their choices. Some did not have enough with five preferences. But a considerable number did not use the full five choices, and a very few chose but one or none at all.

In our usual procedure the individuals tested expressed five degrees of preference, but they did not suggest how many individuals they liked *equally* well. Therefore a series of tests was subsequently made in which the emphasis was slightly differently placed. The subjects were instructed: "As you choose, weigh carefully whether you would like two or three individuals to live with you equally well. You may like two or three persons 'first choice,' or two or three persons 'second choice'; or all the persons to whom you are attracted may be the same degree of choice; or there may be just one 'first choice' and the rest in other degrees, perhaps each at a different degree of preference." The results showed again several levels of preference but often several individuals at the same level of preference. In regard to work a certain young woman named one person first, a man; three persons second, two women and a man; in regard to living in the same house she named no one, preferring to live alone; in regard to love she named one man first and four men second; in regard to social and cultural contact she named ten persons with whom she liked to associate equally well.

## II.

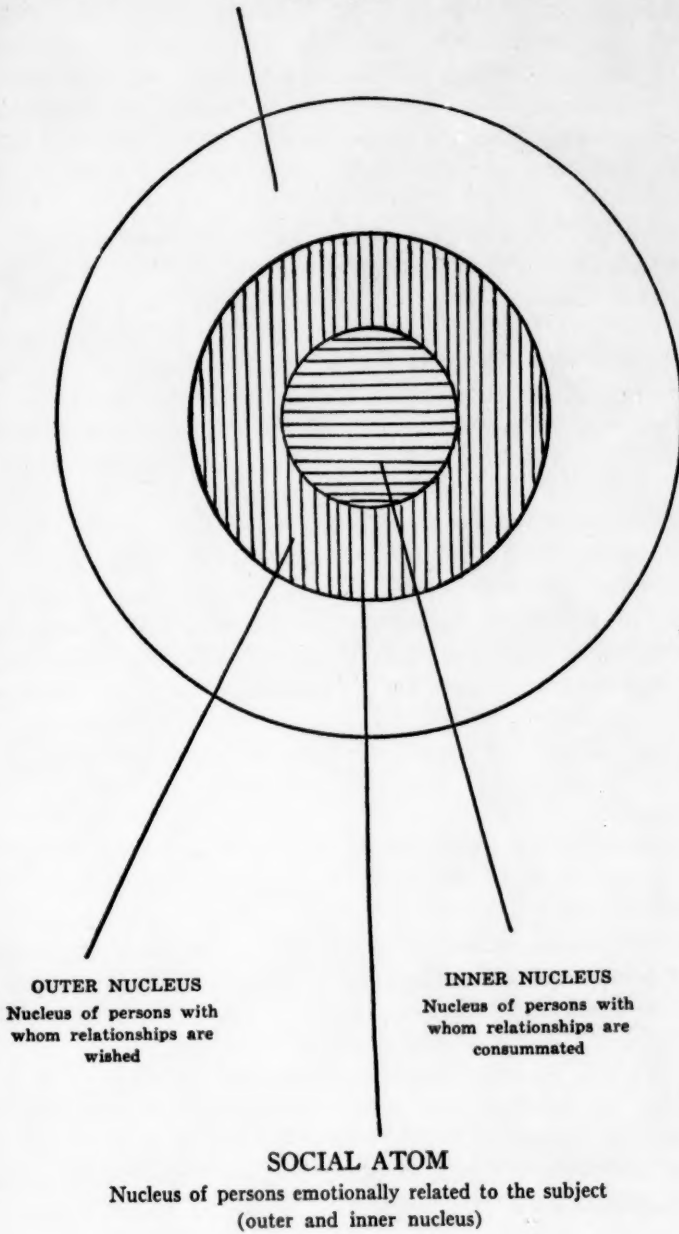
### RELATIONS TOWARD THINGS VS. RELATIONS TOWARD PERSONS

Evidently there are individuals whose feelings of preference are more articulate than those of others. Also, some may have more articulate preferences in respect to one criterion, for instance, work. However, it seemed to us that the wide differences of preferential feeling which individuals reveal who are of similar intelligence and under similar environmental influences cannot be explained satisfactorily by simply calling them more or less articulate. There must be other factors of persistent influence.

Now there are besides the preferences for individuals the preferences for things, objects, values, and objectives, like sex, food, money, ideas, etc. A sociometric test was constructed in which the subjects spontaneously reveal in order of preference the things to which they are attracted: for instance, money, sex, clothes, automobiles, books, etc. An analysis of the results and



ACQUAINTANCE VOLUME—Acquaintances which are without emotional meaning for the subject.



their comparison with the type and degrees of preference for individuals which these subjects showed raised the question: What bearing has the greater or lesser affinity toward individuals upon the classification of character? Are there any definite quantitative classifiable relationships between the affinities which an individual has toward persons and the affinities he has toward other things? Does the sense of affinity of an individual for other individuals diminish as his affinity for things and ideas increases, or vice versa?

To illustrate, let us consider one of the subjects who cares for money most of all and exclusively, being indifferent toward all other things and giving as a reason that with money he can buy all that he wants. It can be well seen that in the case of a person who has such an affection for money the persons with whom he would like to work would matter little; that he would not feel any special preference for one or another person so long as these persons equally support his affection for money. He may divide the persons into those who aid him in getting money and those who are of disadvantage to him in this respect.

The sociometric test for interrelations with persons is modified in the manner described so that it becomes a sociometric test for interrelations with things. The two tests will provide for two measures: the affinities of an individual for persons and the affinities of the same individual for things. The correlation of these two types of affinities will gradually develop a measure of *character*. So much for the individual. In regard to the group, and society as a whole, it promises to accomplish a dream, cherished by many but discarded as futile and impractical: the synthesis of the organic concept of society with the economic concept of society, the inclusion of economics into sociometry.

It is probable that there will be found a close relation between the tendency to have a strong affinity for persons and the tendency to have a weak affinity for things; and vice versa, the tendency to have a strong affinity for things and a weak affinity for persons. It is from such studies that we shall be able to estimate the quantitative difference between levels of preference, as for example the difference between a first and a second choice.

An individual may show strong interest in the ideal of love, and urged by it may act with equal kindness toward everyone regardless of his specific individuality. An individual may show a great interest in power over things and people—for instance, for money as conferring the power to buy—and he may act with equal eagerness to gain money for himself regardless of the specific individualities of the people from whom he has to wrest it. An

individual may show a great interest in sensuous pleasures, for instance, sex, and a slight interest in the specific individuals involved. What is, sociometrically speaking, the affinity, the positive or negative "tele"<sup>1</sup> for each of these things as compared with the tele for the persons whom one meets in pursuing life's goals?

We find that individuals who have a slight interest in *specific* individuals in regard to sex are far from being disinterested in personal characteristics; they may have a great interest in certain *group characteristics* in regard to sex. Such individuals develop little attachment to a specific individual, but may be intensely drawn toward individuals possessing certain physical and mental attributes regardless of their individuality. Such a person craves a certain complex of attributes and little, or not at all, the individual carrying them. He uses the individuals; he is not in love with them. He can emancipate, free, separate himself from a specific individual in regard to sex because he was attached to a *combination of attributes* which exist and grow elsewhere also. His sexual impulse is independent of individual persons. Therefore he may be free of attachment to a pattern of individual traits. The more universally distributed these attributes are or these combinations of attributes, the larger will be the number of persons belonging to the group toward which he is drawn. His "freedom" from a specific individual will be relatively greater, the larger the number of individuals who belong to this group.

In the sociometric tests we may find the dominating preference for sex as an impersonal thing suddenly interrupted if a person of group S complex competes with a person of group Non-S. And in general, the feeling-preferences for various things, values, ideas, objects or objectives may at certain points be interrupted, distorted, and complicated by feeling-preferences for individuals. In regard to money, or the equivalents of money, an individual may proceed to accumulate it undisturbed by the individual differences between its owners until he hits upon an individual or individuals to whom he is sensitive (persons whose association he craves because of their social, intellectual, or "racial" superiority, etc.). Then his emotional energy, hitherto directed toward money, may be interfered with and slowed up by personal elements which are wrongly called subjective. This energy may even be transformed and turned in the opposite direction, into the losing of money, the desire to buy with money the association with this person or these persons who have social standing, political influence, sexual appeal, etc. In regard

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<sup>1</sup>See *Who Shall Survive?* pp. 158-164.

to race as a thing, an individual may find a dominating preference for individuals of a certain race not because of their specific individuality but because of their "race", suddenly interrupted if a person of the group to which he is sensitive competes. This person may not belong to the race required and demanded by him in principle. A monk, subscribing to a certain idea of conduct, may act toward everyone he meets with the same "equalized" affection until this attitude is suddenly interrupted by an individual to whom he is sensitive. It may be useful to differentiate between attraction to individuals for their exclusive individual characteristics—which cannot be "replaced" at least in the thought of the person attracted—and attractions for their group characteristics.

### III.

#### GENERAL SOCIOLOGICAL IMPLICATIONS

The imbalances arising can be harmonized, to some extent at least, through constructive rearrangement of people and of things. But this is only a palliative measure. The true solution would be a spontaneous balancing of all these factors. The question is what is the next stage in the evolution of human society, what kind of society will finally crystallize, perhaps aided in finding its destiny by sociometric guides? Theoretically I can visualize three solutions.

The first possibility is a human society in which the preferences for things entirely dominate the preferences for persons; a society in which attachments to persons are extinguished. Attachments exist only to things independent of persons, and to persons only so far as they carry certain things, since the optimum of satisfaction will depend only upon things and things can be indefinitely "replaced" by other things. The individual being may reach a degree of happiness and balance he has never known heretofore. It would be a technological panacea. The emotional currents between persons would be reduced to zero. A certain kind of love would still matter, but not whom one loves; work would matter but not with whom one works; food would matter but not with whom one eats; ideas would matter, too, but not who embodies them. A society would arise in which individuals become symbols and things the only reality. It may bring an optimum of happiness with the extinction of the interrelation strains. The solitaire, the saint, and the schizophrenic are psychological pioneers in this direction. Feeling-for-things would replace feeling-for-persons.

A second outcome would be a human society in which the preferences for individuals would entirely dominate the preferences for things; a society

in which attachments to things in themselves would be extinguished; attachments would exist only to individuals and to things only as they are an expression of individuals, an emotional or personality panacea.

A third resultant would be a human society in which the preferences for individuals and the preferences for things would be extinguished; it would not matter whom you love or what you eat. All attachments are extinguished: the Buddhistic panacea.

EDITORIAL NOTE: This paper was first published in the "Sociometric Review", January 1936, a publication (now out of print) which preceded "SOCIOMETRY, A JOURNAL OF INTERPERSONAL RELATIONS". The renewed interest in social atom problems made the republication of one of Moreno's early presentations of the subject advisable.



## BOOK REVIEW

SEWARD, GEORGENE, H., *Sex and the Social Order*, New York, McGraw-Hill, 1946, pp. xii and 301.

The relation between sex roles and social organization is a complicated problem, which is demanding increased scientific attention. An exploration of this field is presented in Dr. Seward's book. Sex is defined to include the social role of male and female in the life of the group, as well as mating behavior. The book shows how, as we ascend the vertebrate scale, society assumes increasing control over individual conduct until at the human level we can understand sex only against the setting of the culture as a whole.

After a preliminary chapter designed to give the reader a general orientation to the problem, the hormonal and neural factors in the dynamics of sexual behavior are discussed. The next five chapters present an excellent treatment of sexual behavior in the lower forms of the evolutionary scale from fish to man. A survey of the lower vertebrates reveals mating to be inextricably associated with dominance behavior in the pattern of social life. The common core of these behavior patterns seems to be principally the male sex hormone, which simultaneously induces social and sexual dominance. The female sex hormones are more restricted to reproductive activities and may even exert an inhibitory effect on dominance. At the upper end of the evolutionary scale, among the primates, biological mechanisms are increasingly less rigid in their operation and the social influences more numerous and intricate in their effects on sex roles. Primate precultures differ widely from one another, with dictatorships appearing in groups of macaques, baboons, and rhesus monkeys, while primitive socialism occurs with the cebus howlers.

Human sex behavior in various primitive cultures is discussed in the next two chapters, and the dependence of sex role on the social framework is brought out. In some cultures sex is granted relatively free expression as a source of pleasure and relaxation, while in others it is hedged about with so many restrictions that it is regarded as merely a means of preserving the race. Stereotypes of class distinctions in sex, as in the analogous class distinctions in race, are compellingly infused through all the familiar folkways that surround each new individual.

The next chapter presents a brief historical survey to show how sex roles in western culture reflect changes in the general social setting. Dr. Seward points out that the family in the West has always been organized along patriarchal lines, and different times and places have merely varied

that basic theme. As in all eras, class lines cut across sex lines. Within each class, however, a discrepancy between male and female privilege has appeared. In contemporary life in the United States, men and women are widely separated in social function and the worlds of the two sexes constitute something akin to subcultures. It is hardly surprising that men and women, subjected to such different cultural influences, are molded into two different personality patterns. But it is fallacious, Dr. Seward shows, to assume that such personality differences are intrinsic in the biology of sex and therefore necessitate differential educational treatment.

Chapters 11-14 discuss sexual development of the individual in childhood and adolescence, adult relationships, and sexual decline in old age. The author points out that the actual parts played by males and females at different periods of their life are quite different from the fixed dichotomy we popularly assume. Although girls in our culture suffer more from discontinuities in sex role than do boys, it is not all smooth sailing for the boys. In planning a comprehensive program of sex education, the first and foremost consideration should be given to a revision and clarification of sex behavior patterns. Fathers have relinquished their old authoritarian role in the family without developing any well defined substitute role. The author suggests that if the burden of financial success which the male parent usually carries alone were divided with the mother, the father would be psychologically freer to cultivate his family. If, in turn, the mother were given the opportunity of expressing herself in the vocational world, she would be relieved of the need for compensatory arrogance within the home and could love her family with less ambivalence.

The book concludes with a discussion of sex in postwar society. Postwar opinion, the author believes, endorses greater independence for the single woman but adheres to the tradition of socioeconomic dependence for the married woman. An attitude discrepancy of this kind is filled with risk of emotional conflict for both sexes and points up the need for redefinition of sex roles.

In interpreting the evolution of sex behavior the author repeatedly emphasizes the importance of environmental influences in producing sex differences. Superior culture and achievement seem to reduce this divergence. This result suggests that when inequalities of social pressure are ruled out and members of both sexes enjoy the same kind of training, personality differences between them disappear. A more democratic definition of sex roles appears to be slowly evolving in an inherited patriarchal framework. According to the author, the scientific evidence available at the present time

fails to indicate constitutional sex differences that would justify casting men and women in different sex roles. The emerging dual function of woman as worker-mother will demand extensive readjustments in the social behavior of both men and women. The cooperation of educational institutions from nursery school through college is necessary to accomplish this retraining. Such fundamental changes can become an integral part of group mores only after generations have grown up with them.

The chief criticism of the book is that the author is led to certain conclusions which have not yet been substantiated by scientific data. Particularly open to question is her repeated implication that the community would be enriched by educational methods oriented toward reducing the difference between the social roles of the sexes. Certainly an extensive redefinition of sex role is developing with the continuing deterioration of vocational opportunity within the home, and successful redefinition should involve equal community rights for man and woman. But how much similarity of male and female role would be advisable in such redefinition is open to question. Equality is not necessarily sameness.

The volume is written in a clear and direct style which makes it admirably designed for use as collateral reading in either undergraduate or graduate courses. It should be also a valuable reference work for the sociologist, anthropologist, or social psychologist, engaged in cognate research.

Comprehensive use is made of the scientific material available, as the 701 bibliographical references indicate. But the discussion, inclusive as it is, reveals many gaps in present knowledge and numerous unanswered questions. These undeveloped areas emphasize the need for more large scale investigations such as the extensive Kinsey project now in progress at Indiana University. As an outstanding contribution to the understanding of the vast problem of sex role in social organization the book should thus be for research workers both a resource and a challenge.

CATHARINE PATRICK  
Kansas City, Missouri

## ANNOUNCEMENTS

### *American Sociometric Association*

Annual meeting to be held December 28 and 29, 1947, Hotel Commodore, New York City. (Parallel with the meeting of the American Sociological Society and American Statistical Association.)

Scientific sessions will take place at the Hotel Commodore between 9:00 and 5:00 p.m.

### *Opening of the Moreno Clinic, Beacon, New York*

An out-patient service under this name has been opened at Beacon, New York. The facilities of the Moreno Clinic are particularly suited to the diagnosis and treatment of the following problems:

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### *New Books Received*

Gardner Murphy, "Personality, A Biosocial Approach to Origins and Structure", Harper & Brothers, 1947. Stuart Carter Dodd, "Social Relations in the Middle East", American Press at Beirut, Lebanon, 1946. Theodore M. Newcomb and Eugene L. Hartley, Editors, "Readings in Social Psychology", Henry Holt and Company, 1947. "Current Trends in Psychology", with eight contributors, University of Pittsburgh Press, 1947. Helena Willis Render, "Nurse-patient Relationships in Psychiatry", McGraw-Hill Book Company, Inc., 1947.

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